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Performance Validation of the ANSER Control Laws for the F-18 HARV

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PERFORMANCE VALIDATION OF THE ANSER CONTROL LAWS FOR THE F-18 HARV*

Final Report

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Overview

The Actuated Nose Strakes for Enhanced Rolling (ANSER) Control Laws were developed by NASA Langley and Dryden to be used during Phase III HARV flight testing of the actuated nose strakes. These control laws are a product of the same design methodologies as those used for the NASA-1A control laws. The ANSER control laws will exercise logic for mode switching and nose-strake control that was included in the NASA-1A control laws, but disabled for the NASA-1A flight tests during Phase II. For Phase III of the HARV research flights, nose strakes have been added to the forebody of the aircraft and will be exercised during flight. Furthermore, based on NASA-1A flight test results, some modifications were made to the CDR version of the ANSER Control Laws to improve performance.

The ANSER Control Laws (Ref. 1) were implemented in Ada by NASA Dryden for flight test on the High Alpha Research Vehicle (HARV). The Ada implementation was tested in the Hardware-In-the-Loop (HIL) simulation, and results were compared to those obtained with the NASA Langley Fortran implementation of the control laws which are considered the "truth model". This performance validation process is the same as that used for the NASA-1A Control Laws (Ref. 2). These tests were specified by the *ANSER Performance Validation Test Plan* (Appendix A) and were intended to be a comprehensive performance evaluation of the Ada implementation.

The HIL vs. batch time-history comparisons for the ANSER performance validation checkcases are shown in Appendix B, Part 2. The simulation scripts used to generate these checkcases are shown in Appendix C. A list of issues that arose during the ANSER performance validation tests, usually as a result of differences between the HIL and batch results, is shown in Appendix D. In all checkcases where significant discrepancies existed, analysis was performed to isolate and understand these discrepancies. Appendix D also contains the results of these analyses.

Discussion of Results

As noted in the previous section, some differences were noted between the and batch time-history results, and results of the

analyses of the significant differences can be found in Appendix D. A brief summary of the most important differences, particularly those which resulted in modifications to the control law, are discussed below. See Appendix D for more detail.

Lateral Stick Selection Logic

Effects of the HIL signal selection logic were noticed in the NASA-1A testing and reported in (Ref. 2). This effect was still present during the ANSER Performance Validation Tests and was particularly noticeable on the lateral stick signal. For these tests a first order lead-lag filter was developed and shown to successfully model the signal selected lateral stick. Use of this filter in the batch simulation greatly facilitated comparison of the HIL and batch time histories by removing a major cause of differences between the two.

Lateral Sensitivity

During examination of the results of checkcase 23 a lateral sensitivity characterized by an overshoot in the HIL left strake command was discovered in the angle-of-attack region between 30 and 40 degrees. The ensuing analysis included adding time delays to the batch simulation, running additional simulation cases, and investigating the strake aero model. The result was a modification to the control law consisting of gain changes at 35 and 40 degrees AOA.

Lateral Stick Command Rate Limit

During testing of the lateral sensitivity issue, an error in the lateral stick command rate limit in the Ada code was discovered and corrected.

Pitch Command Limit

During study of checkcase 28, which included a 5 inch longitudinal step input, it was noted that the total pitch stick command, labeled PSGTOT internally in the ANSER longitudinal control system, could exceed 5 inches, which is the aft position limit on the longitudinal stick. Analysis of the problem led to a modification of the control law consisting of the addition of a limiter on PSGTOT.

Other issues discussed in Appendix D include several differences between the HIL and batch simulations which were noted in NASA-1A testing. These include a number of issues relative to surface rate and position limits.

Summary and Conclusions

The Ada implementation of the ANSER control laws was tested in the HIL simulation and compared with the Fortran control law implementation in batch simulation. There are differences between the HIL and batch simulation results, but the significant differences are accounted for by known differences in the simulations. When these differences are taken into account, the time-history results between simulations compare relatively well. The Ada implementation of the ANSER Control Laws performs satisfactorily and is ready for Phase III flight test.

References

1. HARV ANSER Control Law Specification - Revision G, Longitudinal Controls - Version 150, Lateral/Directional Feedback Controls - Version 6.9.9 L, Lateral/Directional Pseudo Controls - Version 8.1, 28 November 1994. Langley Research Center Hampton, Virginia.

2. Performance Validation of the NASA-1A Control Laws for the F-18 HARV Final Report. HARV Document: HA-94-6-66, 21 March 1994.

Appendix A

ANSER PERFORMANCE VALIDATION TEST PLAN

F-18 HARV ANSER CONTROL LAWS PERFORMANCE VALIDATION TEST PLAN

25 May 1995

Revision C

PURPOSE

The purpose of this test plan is to document the approach, test conditions, and data analysis requirements for validating the Actuated Nose Strakes for Enhanced Rolling (ANSER) Control Laws prior to flight test on the F-18 High-Alpha Research Vehicle (HARV). Specifically, this testing is designed to validate that the performance of the control laws, as installed in the flight hardware, is satisfactory for flight tests on the HARV. Also, this testing is designed to exercise the entire control law over the flight envelope and identify any discrepancies between the control law truth model design and the control law that will be flown on the HARV aircraft that was designed from the control law specification. The comparison between control law designs is done using both open and closed loop time history comparisons and in some instances comparisons in the frequency domain. The discrepancies which are targeted for identification are errors in the flight code, errors in the simulation code, and errors in the design logic. Lessons learned from the performance validation with the NASA-1A Control Laws (ref. 1) have been incorporated into this test plan.

METHOD OF TESTS

Truth Model

The ANSER Control Laws were developed using a non-linear, six degree-of-freedom model of the F/A-18 HARV programmed in Advanced Continuous Simulation Language (ACSL) and FORTRAN on a DEC VAX cluster, a Unix based DEC 5000, and on a Unix based SPARCstation 10. This simulation, which is comprised of models of the aerodynamics, thrust, actuator dynamics, sensor and mission computer calculations, and the ANSER Control Laws programmed in FORTRAN Autocode, is the truth model for the Validation Tests.

Control Law Development

During the development phase the ANSER Control Laws was evaluated using the ACSL truth model and also using the DFRC batch simulation and the real-time piloted simulation in the LaRC DMS. The DMS simulation models, programmed in FORTRAN, were very similar to those in the ACSL simulations, and the DMS simulation was validated by comparison with the ACSL truth model. The DFRC batch simulation aero, engine, and sensor models, programmed in FORTRAN, likewise were very similar to those in the ACSL simulations. Performance of the control laws defined by the ANSER Control Law Specification (ref. 2) was established via analysis, batch simulation using the ACSL truth model and DFRC Batch simulations, and piloted simulation using the DMS.

Validation Process

The Validation Tests shall establish that the ANSER Control Laws programmed from the Specification (ref. 2) and implemented in the flight control computer perform satisfactorily for flight testing. This validation will be accompished by comparing directly or indirectly the performance of the flight software via simulation results with the performance of the truth model.

The flight software will be implemented on the DFRC Hardware-in-the-Loop (HIL) simulation. The HIL simulation uses flight qualified flight control computers, mission computer, and flight qualified hardware such as the 1553 MUX BUS. For actuator models the HIL uses analog actuator cards except for the strake actuators which are modeled in C-code software executed at 800 Hz. The RFCS control laws are programmed in Ada and are the exact implementation as onboard the aircraft. The control laws reside in the PACE 1750A processor internal to the 701E flight control computers.

For convenience the HIL simulation results will not always be compared directly to the ACSL simulation results, but will be compared to the results of the DFRC Batch simulation. This DFRC Batch simulation, hosted on a LaRC SPARCstation computer, has been validated by direct comparison of results with the ACSL truth model, and minor differences have been reconciled and documented. The DFRC Batch simulation rather than the ACSL simulations will be used for direct comparison with the HIL because the DFRC Batch simulation more closely emulates the flight control software I/O, simplifies the preparation of script files to run the Validation Tests, and results in a more efficient test operation.

The end product of the Validation Tests will be time-history comparisons of the closed-loop performance between the ANSER Control Laws implemented in FORTRAN Autocode in the DFRC Batch simulation and the ANSER Control Laws Ada flight code implemented in the 1750A processor internal to the 701E Flight Control Computer (FCC) and run in the HIL simulation. The process of validating the flight software against the truth model is depicted in figure 1.

The process described above is very similar to the method used to conduct performance validation tests for the NASA-1A Control Laws. This process worked well for NASA-1A and should be utilized as much as possible to minimize the learning curve and simulation modifications needed to perform ANSER performance validation. A detailed summary of the significant steps taken during the NASA-1A Performance Validation Tests are included in Appendix A. To benefit from this experience this list will serve as a guide during the conduction of the ANSER Validation Tests.

Since the NASA-1A Validation Tests were conducted, an extra step has been added to the validation process, viz., a comparison between the DFRC Batch simulation results and the DFRC All-Software simulation results. The DFRC All-Software simulation uses models identical to those in the DFRC Batch simulation with one main exception and several advantages. The All-Software (SW) simulation uses an actual flight hardware Mission Computer (MC). The advantage of including this step (SW comparison) will be to help identify differences caused by the Mission Computer hardware in the comparison of HIL simulation versus DFRC Batch simulation results. Additionally, the method of recording the data when using the SW simulation is the same method as when using the HIL simulation. Any discrepancies between data retrieval can be identified. Additional benefits from the SW simulation which give it an advantage over the batch simulation include the cockpit interface equipment such as digital display indicators (DDI), the up front controller, and the heads-up display (HUD). This equipment is also the same as in the HIL simulation and allows check out of any of the displays that are unique to the new control law being tested. The SW simulation is also a real-time simulation. This allows a look at the control law

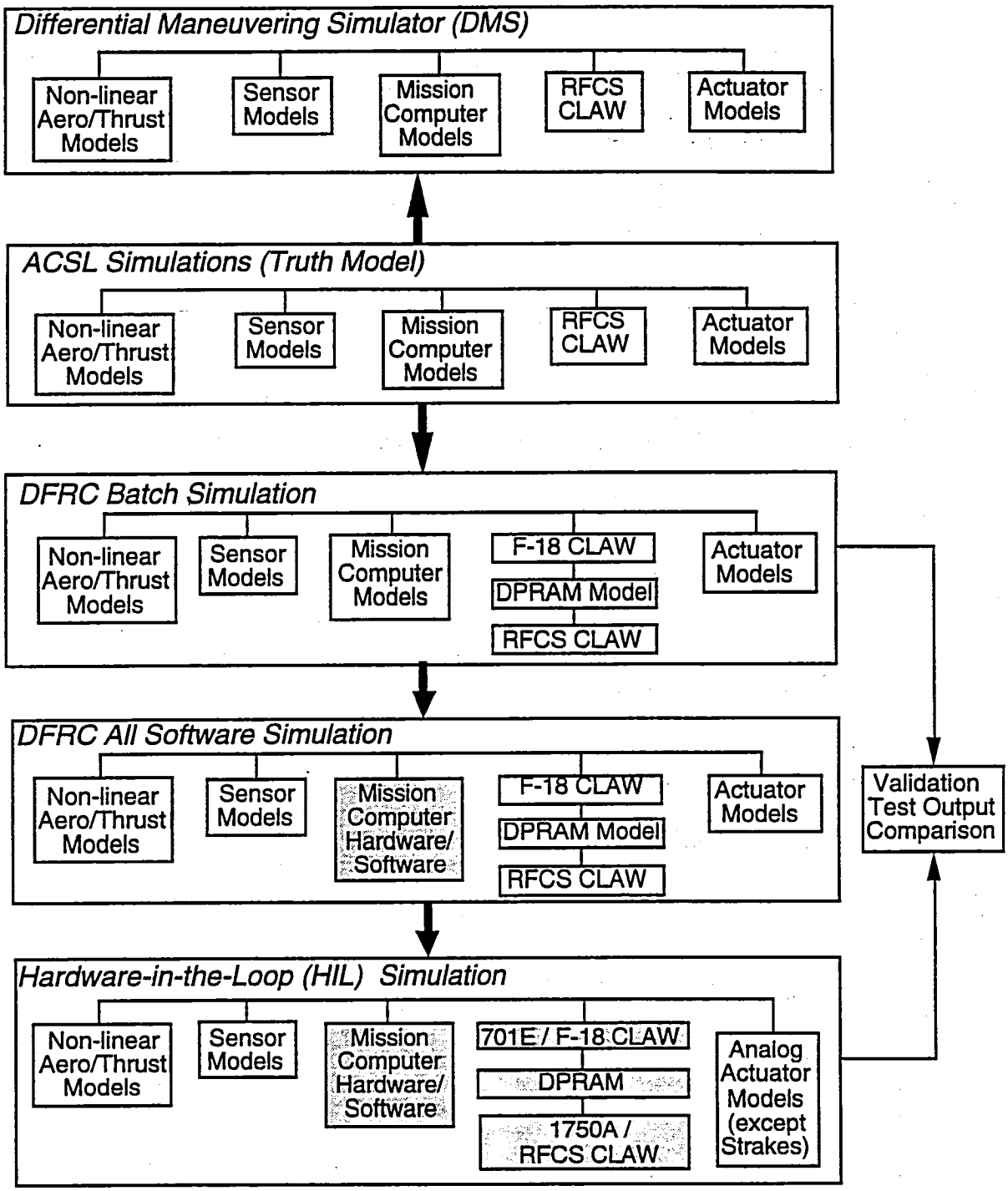


Figure 1.- Sequencial flow in Validation Process

from a piloting perspective, which includes failure modes, handling qualities, symbology, and switchology. The All-Software simulation differs from the HIL simulation only in control law execution and actuator models, and thus it can serve as a backup when the HIL inoperable.

A series of checkcases described in the next section will constitute the Performance Validation Tests. Script files containing the flight condition and inputs for each checkcase will be provided by LaRC for use in the DFRC Batch and All-Software simulations. Checkcases run on the HIL simulation should be configured with the same setup as the script files. If a discrepancy is found between this test plan and the scripts provided, the script file should be taken as the correct test description. These scripts will be used to run the DFRC Batch simulation at LaRC, and a compressed binary (*cmp3*) format file containing time histories of the inputs, outputs, and other variables will be provided to DFRC for comparison with their results.

A more detailed description of the simulations used in the validation process can be found in Appendix B.

TEST CONDITIONS

Performance validation testing will consist of comparing outputs from the DFRC Batch simulation and HIL simulations (closed-loop) using various computer-generated canned inputs. All of these tests are to be performed with the weight and balance configuration shown in Table I.

Table I.
Aircraft Configuration for Validation

GW lbs	C.G., fs in	C.G.,bl in	C.G.,wl in	Ixx slug-ft^2	Iyy slug-ft^2	Izz slug-ft^2	Ixz slug-ft^2
35764.6	456.30	0.0	105.4	22632.6	174246.3	189336.4	-2131.8

The ANSER Control Law has three modes, and performance validation will require testing for all modes: 1) The Thrust Vectoring (TV) mode uses yaw thrust vectoring for directional control and is the ANSER RFCS default mode. This mode is equivalent to the NASA-1A Control Law. 2) The Strake-Thrust Vectoring (STV) mode uses a combination of nose strakes and yaw thrust vectoring for directional control. 3) The Strake (S) mode uses the nose strakes only without yaw thrust vectoring for directional control. Pitch thrust vectoring is enabled for all three modes.

In addition to the three modes, the longitudinal control system has been modified since NASA-1A to allow for different feedback gain sets. This feature, termed Dial-a-Gain, has a default gain set and two optional gain sets. Any of these three gain sets can be selected with any of the three modes.

Canned computer-generated inputs will consist of individual and sequenced inputs intended to excite the longitudinal, lateral, and directional axes. These inputs include doublets and steps; all

inputs will be ramped in over a minimum 0.25 seconds. This ramping of the inputs, which is more realistic then discrete jumps for pilot inputs, is needed to minimize the effects of the stick selection logic in the HIL. The inputs are described in table II and have been prioritized and assigned a checkcase number. The priority was developed with the intent of providing checkcases that would help facilitate checkout by exciting each axis individually and buildup to multiple inputs. Checkcases 1 - 27 are doublet inputs applied to pitch, roll, and yaw axes individually. Checkcases 1 - 9 are for the TV mode, checkcases 10 - 18 are for the STV mode, and checkcases 19 - 27 are for the S mode.

Table II also lists the flight condition along with the type and magnitude of the input. These flight conditions were chosen to test the high speed and middle of the flight envelope strake deployment. The following option flags will be set in the script files:

LX1	= 1 Skips hinge moment calculations
SHNGON	= 0 Turns OFF strake hinge moment model
UX45	= 0 Turns OFF multiplier on asymmetric nose term at high angle-of-attack

Other flags will be set depending on the flight condition tested. Note that all inputs defined in Table II are made from steady-state (trimmed) initial conditions.

Table III lists checkcases 28-33 which are combination ramped pulses with inputs applied to each axis in sequential order. These checkcases are intended to check control law performance during throttle input movement and when coupling is present from another axis. These tests are different from those performed in NASA-1A in that ramped inputs instead of step inputs are used to minimize the signal selection logic effect. Also, the magnitude of the inputs have been scaled to minimize the occurrence of RFCS disengages. Only two flight conditions will be tested in each RFCS mode to keep testing to a minimum.

Table IV lists checkcases 34-40 which are intended to check the transition between ANSER modes TV, STV, and S. Checkcases 34-36 perform one simple transition for each allowable RFCS mode switching. No canned pilot inputs are made during these mode changes. Similarly, checkcases 37-39 again perform only one transition between modes at a different flight condition. However, in these runs, canned pilot inputs will also occur to further test the transition logic when strakes are moving in response to pilot inputs. Finally, checkcase 40 tests the mode transition logic when different RFCS modes are selected, but the control system has not had time to fully transition to another mode. No canned pilot inputs should be performed during this run.

Table V lists checkcases 41-50 which are intended to check the Dial-a-Gain feature in the ANSER RFCS. All of the checkcases in Table V should be performed in TV mode only.

Table II.
Single Axis Closed-Loop Time History Inputs for Performance Validation

Check case	RFCS Mode	Altitude (ft)	Mach Number	AOA (deg)	Load Factor (g's)	Thrust	Inputs
1 2 3	TV	25000	0.35	trim	1.0	trim	+3/-2.5 in. ramped long-stk doublet. ± 2 in. ramped lateral-stk doublet. ± 50 lb ramped pedal doublet.
4 5 6	TV	35000	trim	30.0	1.0	trim	+3/-2.5 in. ramped long-stk doublet. ± 2 in. ramped lateral-stk doublet. ± 50 lb ramped pedal doublet.
7 8 9	TV	16000	trim	50.0	trim	MAX A/B	+3/-2.5 in. ramped long-stk doublet. ± 2 in. ramped lateral-stk doublet. ± 50 lb ramped pedal doublet.
10 11 12	STV	25000	0.35	trim	1.0	trim	+3/-2.5 in. ramped long-stk doublet. ± 2 in. ramped lateral-stk doublet. ± 50 lb ramped pedal doublet.
13 14 15	STV	35000	trim	30.0	1.0	trim	+3/-2.5 in. ramped long-stk doublet. ± 2 in. ramped lateral-stk doublet. ± 50 lb ramped pedal doublet.
16 17 18	STV	16000	trim	50.0	trim	MAX A/B	+3/-2.5 in. ramped long-stk doublet. ± 2 in. ramped lateral-stk doublet. ± 50 lb ramped pedal doublet.
19 20 21	S	25000	0.35	trim	1.0	trim	+3/-2.5 in. ramped long-stk doublet. ± 2 in. ramped lateral-stk doublet. ± 50 lb ramped pedal doublet.
22 23 24	S	35000	trim	30.0	1.0	trim	+3/-2.5 in. ramped long-stk doublet. ± 2 in. ramped lateral-stk doublet. ± 50 lb ramped pedal doublet.
25 26 27	S	16000	trim	50.0	trim	MAX A/B	+3/-2.5 in. ramped long-stk doublet. ± 2 in. ramped lateral-stk doublet. ± 50 lb ramped pedal doublet.

Table III.
Sequential Input Closed-Loop Time History Inputs for Performance Validation

Check case	RFCS Mode	Altitude (ft)	Mach Number	AOA (deg)	Load Factor (g's)	Thrust	Inputs
28	TV	40000	0.68	trim	1.0	trim	PLA ramped input to MAX and IDLE. +5 in. (aft) ramped longitudinal stick pulse. +1.5 in. (rt) ramped lateral stick pulse. -50 lb (lt) ramped pedal pulse.
29	STV	40000	0.68	trim	1.0	trim	PLA ramped input to MAX and IDLE. +5 in. (aft) ramped longitudinal stick pulse. +1.5 in. (rt) ramped lateral stick pulse. -50 lb (lt) ramped pedal pulse.
30	S	40000	0.68	trim	1.0	trim	PLA ramped input to MAX and IDLE. +5 in. (aft) ramped longitudinal stick pulse. +1.5 in. (rt) ramped lateral stick pulse. -50 lb (lt) ramped pedal pulse.
31	TV	25000	0.3	trim	1.0	trim	PLA ramped input to MAX and IDLE. +5 in. (aft) ramped longitudinal stick pulse. -3 in. (lt) ramped lateral stick pulse. +50 lb (rt) ramped pedal pulse.
32	STV	25000	0.3	trim	1.0	trim	PLA ramped input to MAX and IDLE. +5 in. (aft) ramped longitudinal stick pulse. -3 in. (lt) ramped lateral stick pulse. +50 lb (rt) ramped pedal pulse.
33	S	25000	0.3	trim	1.0	trim	PLA ramped input to MAX and IDLE. +5 in. (aft) ramped longitudinal stick pulse. -3 in. (lt) ramped lateral stick pulse. +50 lb (rt) ramped pedal pulse.

Table IV.
RFCS Mode-Switching Closed-Loop Time History Inputs for Performance Validation

Check case	RFCS Mode	Altitude (ft)	Mach Number	AOA (deg)	Load Factor (g's)	Thrust	Inputs
34	TV-STV	33000	0.4	trim	1.0	trim	No stick, Pedal, or Throttle Inputs At 1 sec switch from TV mode to STV mode.
35	STV-S	33000	0.4	trim	1.0	trim	No stick, Pedal, or Throttle Inputs At 1 sec switch from STV mode to S mode.
36	S-TV	33000	0.4	trim	1.0	trim	No stick, Pedal, or Throttle Inputs At 1 sec switch from S mode to TV mode.
37	TV-STV	25000	trim	15.0	1.0	trim	+0.25 in. (aft) ramped longitudinal stick step input at 1 sec. +1.0 in. (rt) ramped lateral stick step input at 2 sec. At 3 sec switch from TV mode to STV mode.
38	STV-S	25000	trim	15.0	1.0	trim	+0.25 in. (aft) ramped longitudinal stick step input at 1 second. +1.0 in. (rt) ramped lateral stick step input at 2 sec. At 3 sec switch from STV mode to S mode.
39	S-TV	25000	trim	15.0	1.0	trim	+0.25 in. (aft) ramped longitudinal stick step input at 1 sec. +1.0 in. (rt) ramped lateral stick step input at 2 sec. At 3 sec switch from S mode to TV mode.
40	TV-STV-S	35000	trim	18.0	1.0	trim	No stick, Pedal, or Throttle Inputs At 1 sec switch from TV mode to STV mode. At 2 sec switch from STV mode to S mode.

Table V.
RFCS Dial-A-Gain Closed-Loop Time History Inputs for Performance Validation

Check case	Dial-a-Gain set	Altitude (ft)	Mach Number	AOA (deg)	Load Factor (g's)	Thrust	Inputs
41	1	25000	0.35	trim	1.0	trim	+3/-2.5 in. ramped long. stick doublet.
42	1	35000	trim	30.0	1.0	trim	+3/-2.5 in. ramped long. stick doublet.
43	1	16000	trim	50.0	trim	MAX A/B	+3/-2.5 in. ramped long. stick doublet.
44	1	40000	0.68	trim	1.0	trim	PLA ramped input to MAX and IDLE. +5 in. (aft) ramped longitudinal stick pulse. +1.5 in. (rt) ramped lateral stick pulse. -50 lb (lt) ramped pedal pulse.
45	1	25000	0.3	trim	1.0	trim	PLA ramped input to MAX and IDLE. +5 in. (aft) ramped longitudinal stick pulse. -3 in. (lt) ramped lateral stick pulse. 50 lb (rt) ramped pedal pulse.
46	2	25000	0.35	trim	1.0	trim	+3/-2.5 in. ramped long. stick doublet.
47	2	35000	trim	30.0	1.0	trim	+3/-2.5 in. ramped long. stick doublet.
48	2	16000	trim	50.0	trim	MAX A/B	+3/-2.5 in. ramped long. stick doublet.
49	2	40000	0.68	trim	1.0	trim	PLA ramped input to MAX and IDLE. +5 in. (aft) ramped longitudinal stick pulse. +1.5 in. (rt) ramped lateral stick pulse. -50 lb (lt) ramped pedal pulse.
50	2	25000	0.3	trim	1.0	trim	PLA ramped input to MAX and IDLE. +5 in. (aft) ramped longitudinal stick pulse. -3 in. (lt) ramped lateral stick pulse. 50 lb (rt) ramped pedal pulse.

REQUIRED DATA

The DFRC Batch simulation and the HIL simulation will be run using identical cockpit control inputs and will produce corresponding time histories of the control system commands, pilot inputs, engine parameters, simulation outputs, status flags, and surface positions for comparison. The data required for comparison are listed below along with the simulation variable names, units, definitions, and comments. Parameters in italic are required for the HIL only. To enhance testing efficiency, variables are listed as they should be plotted using the XPlot/QUICKPLOT setup pages below.

Page 1

DEP, *PSTICK* (HIL Only)*	(inches)	longitudinal stick position
Q	(degrees/second)	body axis pitch rate
ALP	(degrees)	angle-of-attack, α
DLHTD	(degrees)	left horizontal tail position

Page 2

DAP, *LATST_IN**	(inches)	lateral stick position
P	(degrees/second)	body axis roll rate
BTA	(degrees)	angle-of-sideslip
DLAD	(degrees)	left aileron position

Page 3

DRP, *RUDPED_LBS * (HIL Only)*	(lbf)	rudder pedal command
R	(degrees/second)	body axis yaw rate
DRUDL	(degrees)	left rudder position
DRUDR	(degrees)	right rudder position

Page 4

DLEFL	(degrees)	left leading edge flap position
DLEFR	(degrees)	right leading edge flap position
DTEFL	(degrees)	left trailing edge flap position
DTEFR	(degrees)	right trailing edge flap position

Page 5

PJET_CMD	(degrees)	pitch jet angle command
YJET_CMD	(degrees)	yaw jet angle command
XACNZ	(g's)	normal acceleration (a_n) @ sensor
XACAY	(g's)	lateral acceleration (a_y) @ sensor

Page 6

QCI_SEL*	(psf)	RFCS impact pressure, Qc
PSI_SEL*	(psf)	RFCS static pressure, Ps
H	(ft)	altitude
AMCH	(n.d.)	Mach number

Page 7		
THA	(degrees)	pitch angle, θ
PHI	(degrees)	roll angle, ϕ
ALPDOT	(degrees/second)	angle-of-attack rate, $\dot{\alpha}$
BTADOT	(degrees/second)	angle-of-sideslip rate, $\dot{\beta}$
Page 8		
PLAL, PLAR	(%)	left & right throttle positions
G_THR_EST_L*	(lbf)	left engine gross thrust estimate
G_THR_EST_R*	(lbf)	right engine gross thrust estimate
DRHTD	(degrees)	right horizontial tail position
Page 9		
DRAD	(degrees)	right aileron position
PSI	(degrees)	yaw angle, ψ
VANEP1	(degrees)	left top vane position
VANEP2	(degrees)	left outboard vane position
Page 10		
VANEP3	(degrees)	left inboard vane position
VANEP4	(degrees)	right top vane position
VANEP5	(degrees)	right outboard vane position
VANEP6	(degrees)	right inboard vane position
Page 11		
DSTKL	(degrees)	left nose strake position
DSTKR	(degrees)	right nose strake position
XSTRAKE, XTVYAW**	(n.d.)	strake, yaw thrust vectoring select flags
RFCSSEL	(n.d.)	RFCS mode indication
Page 12		
GAINSEL	(n.d.)	Dail-a-Gain select
TVYAW_AUTO,	(n.d.)	yaw thrust vectoring fader
FS_DEPLOY_LIM,	(n.d.)	nose strake fader
FS_ON_LIM **	(n.d.)	nose strake fader
STVYAW*	(n.d.)	yaw thrust vectoring engage
SFSYAW*	(n.d.)	differential strake engage

* Use 1553 BUS 1 (A) or 2 (B) data depending on whichever is cleaner (without dropouts).

** Batch Only

On the 1553 BUS output file created from the HIL simulation, the following diagnostic inputs and outputs are required for performance evaluation. This will speed up the checkout time as questions result from the ANSER performance validation tests performed. More importantly the input parameters will provide the capability to perform open-loop analysis to determine the hardware effects on the ANSER RFCS performance. Such analysis was found to be an important part of the NASA-1A performance validation effort.

Longitudinal ADA input parameter names

AOA_PROBE, AOA_INS, IMPACT_PRESSURE, STATIC_PRESSURE, PRESSURE_RATIO, PITCH_STICK, PITCH_TRIM, PITCH_RATE, NORMAL_ACCEL, TRUE_VELOCITY, COS_THETA_INS, SIN_THETA_INS, COS_PHI_INS, QCFILTER1, QCFILTER2

Longitudinal ADA output parameter names

GTILY1, GTILY2, GTILY3, GTILU1, GTILU2, YCMD, UME11, AOATR, TVSC, KGCT, LOGIC, QCOMP, AOA, DY, SBPAC1, LEFSC1, TEFSC1, PGSTOT, VBRK1, PSTICK

Lateral/Directional ADA input parameter names

LAT_STICK, ROLL_TRIM, COLLECTIVE_STABILATOR_COMMAND, AOA, RUDDER_PEDAL, YAW_TRIM, SIN_AOA, COS_AOA, ROLL_RATE, YAW_RATE, LATERAL_ACCEL, TRUE_VELOCITY, COS_THETA, SIN_PHI, XTVYAW, XSTRAKE, NORMAL_ACCEL, GROSS_THRUST, DYNAMIC_PRESSURE, MACH, ALTITUDE, PITCH_RATE, BDOT_INERT_DPS

Lateral/Directional ADA output parameter names

TVYAW_MP, VROLL, VYAW, VLAT_FILT_RPS2, VDIR_FILT_RPS2, LATST_CMD, NYADJ_G, RSTABCOMP_RPS, DD_LIM_DEG, DL_DEG, DF_DEG, DA_LIM_DEG, DR_LIM_DEG, NABYNTV, LATST_IN, RUDPED_LBS, LABYLTV, PSTAB, AYCORR_G, PDSMAX, TVYAW_AUTO, FS_DEPLOY_LIM, FS_ON_LIM, BDOTINERT_DPS, BDOT_DPS

The output parameters listed above include parameters that were not included in the V150.1 instrumentation list due to recording space constraints. After the Batch versus HIL time history comparisions are complete, the HIL checkcases which have the largest disecrepancies should be run with the additional parameters listed above. This will save time and concentrate resources on the HIL runs that need further analysis.

ACCEPTANCE CRITERIA

The acceptance criteria will be to achieve differences between the outputs of the HIL and the DFRC Batch simulation that are as small as possible and through analysis and test to account for all remaining differences. Lessons learned from the NASA-1A checkout resulted in studies that accounted for significant differences that can occur between the HIL and batch simulations. (See Reference 1) Some of the differences, such as the signal selection logic, time delays, and data recording, are a result of the hardware setup and have been noted as such in the NASA-1A Performance Validation Test documentation. Although these differences have been identified, the goal should be to reduce discrepancies between the HIL and batch simulations whenever possible. For those cases where difference exists, engineering judgment based on past experience will be used to determine acceptability of the flight code performance.

REFERENCES

1. Performance Validation of the NASA-1A Control Laws for the F-18 HARV Final Report. HARV Document: HA-94-6-66, 21 March 1994.

2. HARV ANSER Control Law Specification - Revision G, Longitudinal Controls - Version 150, Lateral/Directional Feedback Controls - Version 6.9.9 L, Lateral/Directional Pseudo Controls - Version 8.1, 27 October 1994. Langley Research Center Hampton, Virginia.

APPENDIX A
SUMMARY OF NASA-1A VALIDATION TEST PROCEDURES

1. Script files were created and checkcases were run by Langley Research Center (LaRC) using NASA-1A FORTRAN Autocode in the Dryden Flight Research Center (DFRC) batch simulation.
2. An executable file of the ADA developed by DFRC was created to run in the batch simulation. Output parameters from the ADA code were added for analysis.
3. The ADA executable was run and checkcases were generated with the same script files used for the NASA-1A FORTRAN Autocode.
4. Time history comparison plots were created to identify differences between NASA-1A FORTRAN Autocode and ADA code checkcases. Time histories with significant differences were identified for further analysis.
5. The ADA executable was re-run to generate checkcases with all inputs to Research Flight Control System (RFCS) recorded.
6. Open-loop analysis was performed by using all recorded inputs from the ADA executable checkcases to drive the NASA-1A FORTRAN Autocode. Differences between outputs of the NASA-1A FORTRAN Autocode closed-loop versus open-loop runs were identified. Internal control law parameters were compared to identify differences. Once identified, these coding differences were resolved until closed-loop FORTRAN Autocode versus ADA code produced similar results.
7. Checkcases were run on Hardware-in-the-Loop (HIL) simulation with scripts developed for the HIL which duplicated the batch simulation setup.
8. Closed-loop time history comparisons were made between the NASA-1A FORTRAN Autocode batch simulation runs and the HIL which uses the ADA code. Checkcases with significant differences were identified for further analysis.
9. Additional HIL runs were made with a patch to the ADA code which allowed recording of all inputs to RFCS.
10. Open-loop analysis was again performed this time using HIL input data to drive the NASA-1A FORTRAN Autocode. Control system outputs between the HIL closed-loop and the open-loop FORTRAN Autocode runs produced identical results. This was expected since step 6 resolved all coding differences between FORTRAN Autocode and the ADA code.
11. Additional open-loop analysis was made this time replacing each HIL input to NASA-1A FORTRAN Autocode with the equivalent input data obtained from the closed-loop NASA-1A FORTRAN Autocode batch simulation run. This identified which HIL inputs were causing the closed-loop discrepancies between the NASA-1A FORTRAN Autocode batch simulation runs and the results obtained with the ADA code used on the HIL.
12. Step 11 lead into various studies on the HIL simulation operation with regard to time delays, input magnitude scaling (impact pressure), stick selection logic, rate limits, etc.
13. The batch simulation was modified to resemble the HIL in terms of time delay, and input magnitude scaling (impact pressure). Also, the actual stick and pedal inputs after the HIL stick selection logic were used to drive the batch simulation for a particular HIL simulation run. This eliminated the HIL stick selection logic impact on the closed-loop FORTRAN Autocode batch simulation run. Using this batch simulation setup to generate a checkcase produced results which were equivalent to that obtained from the closed-loop HIL run.

14. Documentation of the results obtained during the above steps were written up to be included in the final performance validation report. (ref. 1)

The above steps are now written after the fact and there were many side paths and repeat steps taken as the performance validation process evolved. But this list does serve to document the critical steps and largest time consuming tasks taken to validate the DFRC ADA code. The list provides the general flow that should be used during the ANSER performance validation process.

APPENDIX B
DESCRIPTION OF SIMULATIONS

ACSL

The control laws defined in ANSER Control Law Specification - Revision G (ref. 2) have been implemented in FORTRAN Autocode and installed in the ACSL simulations. The ANSER aero model and actuator model are also in these simulations. The ACSL simulation is hosted on a SUN SPARCstation 10, and the control laws are called at an 80 Hz frame rate.

DFRC Batch

The control laws defined in ANSER Control Law Specification - Revision G and programmed in FORTRAN Autocode have also been implemented in release 12 of the DFRC Batch simulation at LaRC. This simulation is hosted on a SUN SPARCstation 10. Listed below are some of the known differences the DFRC Batch simulation has which are either not included or implemented differently in the ACSL Batch simulation.

1. 701E control system.
2. Dual Port Ram Model (DPRAM).
3. Engage/Disengage switching between 701E and RFCS.
4. Ada code.
5. 160 Hz frame rate with I/O to DPRAM as defined in Interface Requirements Specification.
6. Trim method and options.
7. Subroutine calling sequences.
8. Calling sequence of FORTRAN Autocode. See Appendix C.

DFRC All-Software

The All-Software simulation is hosted on a Silicon Graphics Onyx computer running in Fortran at 160 Hz. The control laws (Ada code) are a direct derivative of the flight software with modifications made only for the purpose of integrating with the All-Software environment. This is a real-time simulation with cockpit, displays, and visuals identical to the HIL simulation and provides an intermediate step between the batch simulation and the HIL. The DFRC All-Software simulation uses models identical to those in the DFRC Batch simulation with one main exception; the All-Software (SW) simulation uses an actual flight hardware Mission Computer (MC),. The method of recording data when using the SW simulation is the same method as when using the HIL simulation. The All-Software simulation differs from the HIL simulation only in control law execution and actuator models, and thus it can serve as a backup when the HIL inoperable.

DFRC Hardware-in-the-Loop (HIL)

The HIL simulation contains the control laws defined in ANSER Control Law Specification - Revision G programmed in Ada and implemented in the Pace 1750A Flight Control Computer. The HIL utilizes a FORTRAN aero/thrust model which is operated on an ONYX computer and is nearly identical to that in the ACSL simulation. (It is identical to aero/thrust models in the DFRC

Batch and All-Software simulations.) The actuators are implemented as analog models with no hinge moment effects modeled. The HIL simulation uses an actual mission computer. The RFCS I/O communicates through DPRAM with the 701E control system, which drives the actuator model and thus the aircraft dynamics

Figure B1 presents a summary of the various LaRC and DFRC simulations that will be utilized for the ANSER Performance Validation Tests.

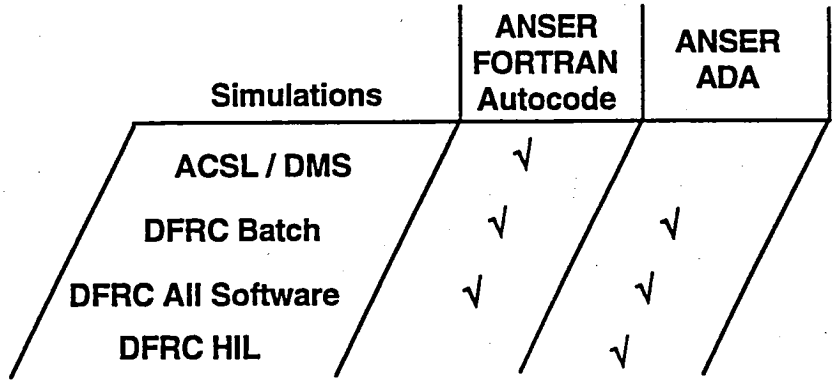


Figure B1. - Simulation Summary

A consistent method of naming executables between LaRC and DFRC during the ANSER checkout will aid the simulation users and eliminate confusion. Therefore, the control law executable code to be linked into the DFRC Batch simulations will be designated *rfcs150.1* for the Ada code and *ansercl_v150.1* for the FORTRAN Autocode. When updates to the code are created, the number in this filename will be updated to reflect changes.

APPENDIX C
FORTRAN AUTOCODE

FORTRAN Autocode from the ACSL Batch simulation was modified to run at 160 Hz in the DFRC Batch simulation. This implementation does not contain the same structure as the ADA developed and coded by DFRC. Many of the control law tasks in the ADA have been broken up over the sixteen 160 Hz frame clock that the 1750A processor runs I/O. For example, in the Ada code, a majority of the longitudinal control laws and some lateral/directional gain schedules are computed on even 160 Hz frames. The majority of the lateral/directional control laws along with the mixer/predictor are computed on odd 160 Hz frames. But certain computations like the leading and trailing edge flap commands are computed every 4th 160 Hz frame. This ADA structure was coded to minimize the process time for RFCS execution. The FORTRAN Autocode developed at LaRC does not lend itself to be tasked in the same structure as the ADA code. The FORTRAN Autocode was developed to run at 40 and 80 Hz frame rates. More specifically the ANSER longitudinal control law is contained in two subroutines, one that computes 40 Hz tasks (Subroutine ***USR18***) and one that computes 80 Hz tasks (***USR19***). For the ANSER lateral/directional control laws, one subroutine (***USR03***) serves as the interface that contains all the I/O to 13 other FORTRAN subroutines that comprise the ANSER lateral/directional control laws. The collection of FORTRAN subroutines that makeup the Mixer/Predictor run at 80 Hz.

The calling sequence for the FORTRAN Autocode implemented in the DFRC Batch simulation is presented in Figure C1. For the RFCS FORTRAN Autocode, the 80 Hz longitudinal tasks are called on the even frame, and the lateral/directional control laws and mixer/predictor are called on the odd frames. The 40 Hz longitudinal tasks are called on alternate even frame. Also, the ANSER control laws utilize a FORTRAN Autocode subroutine (***USR13***) that combines the symmetric and asymmetric commands into left and right commands; this subroutine is called on the odd frame. The implementation described above for the FORTRAN Autocode in the 160 Hz simulation will produce small differences when compared to the FORTRAN Autocode in the 80 Hz simulation. But the differences are small and allow the FORTRAN Autocode to be run more closely like the structure of the ADA code.

Even	Odd			
160 Hz frame	160 Hz frame			
Longitudinal ***USR18*** ***USR19***	Lateral/ Directional ***USR03*** Command Mixer ***USR13*** Mixer/Predictor ***FORTRAN***	Longitudinal ***USR19***	Lateral/ Directional ***USR03*** Command Mixer ***USR13*** Mixer/Predictor ***FORTRAN***	Longitudinal ***USR18*** ***USR19***

Figure C1.- FORTRAN Autocode Calling Sequence in DFRC Batch Simulation

Appendix C

HARDWARE-IN-THE-LOOP AND BATCH SIMULATION SCRIPTS

BATCH SCRIPTS

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.0;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=0.35
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_1
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_1
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;ROLL=1;PITCH=0
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=0.35
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_2
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0;
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_2
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=0.35
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_3
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_3
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.0;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   trim with stick trim
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;Trim;ALP=30.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha = theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_4
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = TRIM,
THRINP=1;THRSET=0;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_4
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;ROLL=1;PITCH=0
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;TRIM;ALP=30.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha = theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_5
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = TRIM,
THRINP=1;THRSET=0;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_5
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;TRIM;ALP=30.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha = theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_6
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = TRIM,
THRINP=1;THRSET=0;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_6
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.0;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   initial conditions
IC;H=16000;TRIM;ALP=50.
PAUSE 5.0
US; 7=0.005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha not equal to theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=9500
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_7
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_7
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAl;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;ROLL=1;PITCH=0
2;YAW=0;THROTTLE=0
SI;1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   initial conditions
IC;H=16000;TRIM;ALP=50.
PAUSE 5.0
US; 7=0.005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha not equal to theta
LS;16=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=9500
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_8
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_8
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
---   arm and engage rfcs
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=1
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   initial conditions
IC;H=16000;TRIM;ALP=50.
PAUSE 5.0
US; 7=0.005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha not equal to theta
LS;16=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=9500
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_9
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_9
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.0;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=0.35
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_10
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_10
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;ROLL=1;PITCH=0
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=0.35
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_11
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_11
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IG;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=0.35
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_12
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_12
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;TRIM;ALP=30.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha = theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_13
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
pause 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_13
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;ROLL=1;PITCH=0
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;TRIM;ALP=30.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha = theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_14
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_14
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;TRIM;ALP=30.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha = theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_15
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_15
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.;PA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   initial conditions
IC;H=16000;TRIM;ALP=50.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha not equal to theta
LS;16=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=9500
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_16
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_16
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
---   arm and engage rfcs
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;ROLL=1;PITCH=0
2;YAW=0;THROTTLE=0
SI;1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   initial conditions
IC;H=16000;TRIM;ALP=50.
PAUSE 5.0
US; 7=0.0005
VAL
ARMREQ=1
ZRMENG=1
---   alpha not equal to theta
LS;16=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=9500
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_17
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_17
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=1
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   initial conditions
IC;H=16000;TRIM;ALP=50.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha not equal to theta
LS;16=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=9500
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_18
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_18
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=0.35
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha equal to theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_19
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_19
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;ROLL=1;PITCH=0
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=0.35
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_20
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_20
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=0.35
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_21
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_21
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.;PA2=2.6
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;TRIM;ALP=30.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha = theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_22
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = TRIM,
THRINP=1;THRSET=0;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_22
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;ROLL=1;PITCH=0
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;TRIM;ALP=29.94
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha = theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_23
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = TRIM,
THRINP=1;THRSET=0;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_23
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;TRIM;ALP=30.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha = theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_24
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = TRIM,
THRINP=1;THRSET=0;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_24
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.;PA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   initial conditions
IC;H=16000;TRIM;ALP=50.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha not equal to theta
LS;16=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=9500
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_25
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_25
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;ROLL=1;PITCH=0
2;YAW=0;THROTTLE=0
SI;1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   initial conditions
IC;H=16000;TRIM;ALP=50.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha not equal to theta
LS;16=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=9500
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_26
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_26
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
---   arm and engage rfcs
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=1
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   initial conditions
IC;H=16000;TRIM;ALP=50.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha not equal to theta
LS;16=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=9500
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_27
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_27
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=0.5;PT2=0.75;PT3=3.;PT4=3.25
PA1=5
RPULSE=1;RRAMPED=1
RT1=3.25;RT2=3.5;RT3=6.75;RT4=7.
RA1=1.5
2
YPULSE=1;YRAMPED=1
YT1=7.75;YT2=8;YT3=9;YT4=10
YA1=-50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
US;80=100.;81=100.
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   initial conditions
IC;H=40000;AMCH=.68
---   Set record length to 15 sec
SC;READ=anser
RTDW;IWRTFR=2400
RDWPTH=ANSER_PERF_VAL_28
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 15 sec
TIMOP=15.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON, Nose Strakes OFF
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_28
```

```
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=0.5;PT2=0.75;PT3=3.;PT4=3.25
PA1=5
RPULSE=1;RRAMPED=1
RT1=3.25;RT2=3.5;RT3=6.75;RT4=7.
RA1=1.5
2
YPULSE=1;YRAMPED=1
YT1=7.75;YT2=8;YT3=9;YT4=10
YA1=-50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
US;80=100.;81=100.
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   initial conditions
IC;H=40000;AMCH=.68
---   Set record length to 15 sec
SC;READ=anser
RTDW;IWRTFR=2400
RDWPTH=ANSER_PERF_VAL_29
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 15 sec
TIMOP=15.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_29
```

```
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
---   arm and engage rfcs
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=0.5;PT2=0.75;PT3=3.;PT4=3.25
PA1=5
RPULSE=1;RRAMPED=1
RT1=3.25;RT2=3.5;RT3=6.75;RT4=7.
RA1=1.5
2
YPULSE=1;YRAMPED=1
YT1=7.75;YT2=8;YT3=9;YT4=10
YA1=-50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
----   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
US;80=100.;81=100.
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   initial conditions
IC;H=40000;AMCH=.68
---   Set record length to 15 sec
SC;READ=anser
RTDW;IWRTFR=2400
RDWPTH=ANSER_PERF_VAL_30
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 15 sec
TIMOP=15.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
```

```
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_30
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=7.25;PT2=7.5;PT3=8.75;PT4=9.
PA1=5
RPULSE=1;RRAMPED=1
RT1=.5;RT2=.75;RT3=4.75;RT4=5.
RA1=-3
2
YPULSE=1;YRAMPED=1
YT1=5.;YT2=5.25;YT3=6.25;YT4=7.25
YA1=50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
US;80=100.;81=100.
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   initial conditions
IC;H=25000;AMCH=.3
---   Set record length to 15 sec
SC;READ=anser
RTDW;IWRTFR=2400
RDWPTH=ANSER_PERF_VAL_31
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 15 sec
TIMOP=15.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON, Nose Strakes OFF
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_31
```

```
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=7.25;PT2=7.5;PT3=8.75;PT4=9.
PA1=5
RPULSE=1;RRAMPED=1
RT1=.5;RT2=.75;RT3=4.75;RT4=5.
RA1=-3
2
YPULSE=1;YRAMPED=1
YT1=5.;YT2=5.25;YT3=6.25;YT4=7.25
YA1=50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
US;80=100.;81=100.
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=.3
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   Set record length to 15 sec
SC;READ=anser
RTDW;IWRTFR=2400
RDWPTH=ANSER_PERF_VAL_32
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 15 sec
TIMOP=15.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_32
```

```
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
---   arm and engage rfcs
VAL;WITHADA=1
ARMREQ=1
ZRMENG=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=7.25;PT2=7.5;PT3=8.75;PT4=9.
PA1=5
RPULSE=1;RRAMPED=1
RT1=.5;RT2=.75;RT3=4.75;RT4=5.
RA1=-3
2
YPULSE=1;YRAMPED=1
YT1=5.;YT2=5.25;YT3=6.25;YT4=7.25
YA1=50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
US;80=100.;81=100.
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   alpha equal to theta
LS;16=0
---   initial conditions
IC;H=25000;AMCH=.3
---   Set record length to 15 sec
SC;READ=anser
RTDW;IWRTFR=2400
RDWPTH=ANSER_PERF_VAL_33
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 15 sec
TIMOP=15.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
```

```
---   operate
ALL;LTEST=1;      ---   anser_perf_val_33
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---
---   set up trim loop
TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=33000;AMCH=0.4
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_34
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   TV Mode
---   Use the TST page to switch from TV to STV Mode at 1 second.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=1;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1;BIAS3=0.0;T1=2.62475;T2=8.
---   operate
ALL;LTEST=1;      ---   anser_perf_val_34
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=33000;AMCH=0.4
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_35
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Use the TST page to switch from STV Mode to S Mode at 1 second.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=1;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1;BIAS3=0.0;T1=2.4085;T2=8.
---   operate
ALL;LTEST=1;      ---   anser_perf_val_35
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   alpha equal to theta
LS;16=0
---   initial conditions
IC;H=33000;AMCH=0.4
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_36
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Use the TST page to switch from S Mode to TV at 1 second.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=1;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1;BIAS3=0.0;T1=2.7;T2=8.
---   operate
ALL;LTEST=1;      ---   anser_perf_val_36
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
```

```
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=0;THROTTLE=0
SI;1;PPULSE=1;PRAMPED=1
PT1=1;PT2=1.25;PT3=8.;PT4=8.25
PA1=0.25
RPULSE=1;RRAMPED=1
RT1=2.;RT2=2.25;RT3=8.;RT4=8.25
RA1=1.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
---   initial conditions
TRIM;ALP=15.
PAUSE 5.0
US; 7=0.0005
IC;H=25000
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_37
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   TV Mode
---   Use the TST page to switch from TV to STV Mode at 3 seconds.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=1;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1;BIAS3=0.0;T1=3.4635;T2=8.
---   operate
ALL;LTEST=1;      ---   anser_perf_val_37
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
```

```
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=0;THROTTLE=0
SI;1;PPULSE=1;PRAMPED=1
PT1=1;PT2=1.25;PT3=8.;PT4=8.25
PA1=0.25
RPULSE=1;RRAMPED=1.
RT1=2.;RT2=2.25;RT3=8.;RT4=8.25
RA1=1.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
---   initial conditions
TRIM;ALP=15.
PAUSE 5.0
US; 7=0.0005
IC;H=25000
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_38
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Use the TST page to switch from STV to S Mode at 3 seconds.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=1;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1;BIAS3=0.0;T1=3.4;T2=8.
---   operate
ALL;LTEST=1;      ---   anser_perf_val_38
---   reset
```

```
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=0;THROTTLE=0
SI;1;PPULSE=1;PRAMPED=1
PT1=1;PT2=1.25;PT3=8.;PT4=8.25
PA1=2.0
RPULSE=1;RRAMPED=1
RT1=2.;RT2=2.25;RT3=8.;RT4=8.25
RA1=1.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
---   initial conditions
TRIM;ALP=15.
PAUSE 5.0
US; 7=0.0005
IC;H=25000
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_39
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Dail-A-Gain option
RFCSGAIN=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Use the TST page to switch from S to TV Mode at 3 seconds.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=1;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1;BIAS3=0.0;T1=3.3;T2=8.
---   operate
```

```
ALL;LTEST=1;      ---    anser_perf_val_39
---    reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;ALP=18.
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=35000
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha equal to theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_40
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Dail-A-Gain option
RFCSGAIN=0---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   TV Mode
---   Use the TST page to switch from TV to STV Mode
---   at 1 second and from STV to S Mode at 2.5 seconds.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=1;SIMG2=0.0;SIMG3=0.0;SIMG4=0.0
INPG1=1.0;INPG2=1.0;INPG3=1.0;INPG4=1.0
BIAS1=1;BIAS2=0.0;BIAS3=1;BIAS4=0.0
T1=1.56625.0;T2=1.57875;T3=2.8;T4=3.07875
---   operate
ALL;LTEST=1;      ---   anser_perf_val_40
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.0;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=0.35
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_41
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_41
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.0;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   trim with stick trim
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;Trim;ALP=30.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha = theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_42
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_42
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.0;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   initial conditions
IC;H=16000;TRIM;ALP=50.
PAUSE 5.0
US; 7=0.005
---   alpha not equal to theta
LS;16=1
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=9500
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_43
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_43
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=0.5;PT2=0.75;PT3=3.;PT4=3.25
PA1=5
RPULSE=1;RRAMPED=1
RT1=3.25;RT2=3.5;RT3=6.75;RT4=7.
RA1=1.5
2
YPULSE=1;YRAMPED=1
YT1=7.75;YT2=8;YT3=9;YT4=10
YA1=-50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
US;80=100.;81=100.
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=40000;AMCH=.68
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   Set record length to 15 sec
SC;READ=anser
RTDW;IWRTFR=2400
RDWPTH=ANSER_PERF_VAL_44
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 15 sec
TIMOP=15.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON, Nose Strakes OFF
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_44
```

```
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=7.25;PT2=7.5;PT3=8.75;PT4=9.
PA1=5
RPULSE=1;RRAMPED=1
RT1=.5;RT2=.75;RT3=4.75;RT4=5.
RA1=-3
2
YPULSE=1;YRAMPED=1
YT1=5.;YT2=5.25;YT3=6.25;YT4=7.25
YA1=50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
US;80=100.;81=100.
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   initial conditions
IC;H=25000;AMCH=.3
---   alpha equal to theta
LS;16=0
---   Set record length to 15 sec
SC;READ=anser
RTDW;IWRTFR=2400
RDWPTH=ANSER_PERF_VAL_45
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 15 sec
TIMOP=15.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON, Nose Strakes OFF
RFCSMODE=0
---   Dail-A-Gain option
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_45
```

```
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.0;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   initial conditions
IC;H=25000;AMCH=0.35
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_46
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
--- PAUSE 1.
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_46
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.0;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;Trim;ALP=30.
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha = theta
LS;16=0
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_47
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
--- PAUSE 1.
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_47
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0;2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=3.0;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   initial conditions
IC;H=16000;TRIM;ALP=50.
PAUSE 5.0
US; 7=0.005
---   arm and engage rfcs
VAL;ARMREQ=1;ZRMENG=1
---   alpha not equal to theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---  set up trim loop
VAL;TRMMAX=0.0005;IMXTST=9500
---   Set record length to 8 sec
SC;READ=anser
RTDW;IWRTFR=1280
RDWPTH=ANSER_PERF_VAL_48
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 8 sec
TIMOP=8.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=0
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON
RFCSMODE=0
---   Dail-A-Gain option
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
--- PAUSE 1.
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   set plar=plal
THRLCK=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_48
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0;2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=0.5;PT2=0.75;PT3=3.;PT4=3.25
PA1=5
RPULSE=1;RRAMPED=1
RT1=3.25;RT2=3.5;RT3=6.75;RT4=7.
RA1=1.5
2
YPULSE=1;YRAMPED=1
YT1=7.75;YT2=8;YT3=9;YT4=10
YA1=-50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
US;80=100.;81=100.
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
VAL;TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   initial conditions
IC;H=40000;AMCH=.68
---   Set record length to 15 sec
SC;READ=anser
RTDW;IWRTFR=2400
RDWPTH=ANSER_PERF_VAL_49
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 15 sec
TIMOP=15.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON, Nose Strakes OFF
RFCSMODE=0
---   Dail-A-Gain option
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
--- PAUSE 1.
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
```

```
---   operate
ALL;LTEST=1;      ---   anser_perf_val_49
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   Script for ANSER Performance Validation checkout.
---
VAL;WITHADA=1
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=7.25;PT2=7.5;PT3=8.75;PT4=9.
PA1=5
RPULSE=1;RRAMPED=1
RT1=.5;RT2=.75;RT3=4.75;RT4=5.
RA1=-3
2
YPULSE=1;YRAMPED=1
YT1=5.;YT2=5.25;YT3=6.25;YT4=7.25
YA1=50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim
VAL;TRIMDEP=1
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
US;80=100.;81=100.
---   skip hinge moment calculations
LX;1=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=6000
TRIM;V
PAUSE 5.0
US; 7=0.0005
---   arm and engage rfcs
VAL
ARMREQ=1
ZRMENG=1
---   alpha equal to theta
LS;16=0
---   initial conditions
IC;H=25000;AMCH=.3
---   Set record length to 15 sec
SC;READ=anser
RTDW;IWRTFR=2400
RDWPTH=ANSER_PERF_VAL_50
RTINIT=1;RTWRIT=1;IFRAMW=2
---    set RFCS 150.0 stick gain
VAL; DEPGAIN=-0.005
---   Time in operate mode 15 sec
TIMOP=15.0
---   LSTRAKE=1 turns ON strake aero
LSTRAKE=1
---   Turn OFF strake hinge moment model
SHNGON=0
---   Yaw Thrust Vectoring ON, Nose Strakes OFF
RFCSMODE=0
---   Dail-A-Gain option
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
--- PAUSE 1.
--- RFCSGAIN=1;PAUSE 1.;RFCSGAIN=0.
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   Turn off Cockpit Interface Unit (CIU)
LCIU=0
```

```
---   operate
ALL;LTEST=1;      ---   anser_perf_val_50
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
LS;16=0
TRIM;V
IC;AMCH=.4
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

HARDWARE-IN-THE-LOOP SCRIPTS

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #1, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.35
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_1
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   operate
ALL;LTEST=1;      ---   anser_perf_val_1
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #2, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=1
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.35
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_2
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   operate
ALL;LTEST=1;      ---   anser_perf_val_2
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #3, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.35
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.f  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_3
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   operate
ALL;LTEST=1;      ---   anser_perf_val_3
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---    HIL Script for ANSER Performance Validation checkout.
---   Checkcase #4, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=30.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_4
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   operate
ALL;LTEST=1;      ---   anser_perf_val_4
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #5, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=1
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=30.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_5
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   operate
ALL;LTEST=1;      ---   anser_perf_val_5
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #6, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=30.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_6
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   operate
ALL;LTEST=1;      ---   anser_perf_val_6
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #7, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   PLAL & PLAR = 100%
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=16000;AMCH=0.4;TRIM;ALP=50.
---   pause for 3 seconds
PAUSE 3.0
---   alp not equal theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_7
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   operate
ALL;LTEST=1;      ---   anser_perf_val_7
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
LS;16=0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #8, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=1
2;YAW=0;THROTTLE=0
SI;1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   PLAL & PLAR = 100%
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0001;IMXTST=10500
---   initial conditions
IC;H=16000;AMCH=0.4;TRIM;ALP=50.
---   pause for 3 seconds
PAUSE 3.0
---   alp not equal theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_8
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   operate
ALL;PAUSE 30;LTEST=1;      ---   anser_perf_val_8
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
LS;16=0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #9, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   PLAL & PLAR = 100%
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0001;IMXTST=10500
---   initial conditions
IC;H=16000;AMCH=0.4;TRIM;ALP=50.
---   pause for 3 seconds
PAUSE 3.0
---   alp not equal theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_9
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   operate
ALL;PAUSE 30;LTEST=1;      ---   anser_perf_val_9
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
LS;16=0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #10, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.35
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_10
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_10
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #11, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=1
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.35
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_11
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_11
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #12, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.35
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_12
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_12
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #13, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=30.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_13
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_13
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #14, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=1
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=30.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_14
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_14
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #15, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=30.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_15
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_15
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #16, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=1.818;PA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   PLAL & PLAR = 100%
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=16000;AMCH=0.4;TRIM;ALP=50.
---   pause for 3 seconds
PAUSE 3.0
---   alp not equal theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_16
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_16
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
LS;16=0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #17, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=1
2;YAW=0;THROTTLE=0
SI;1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   PLAL & PLAR = 100%
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0001;IMXTST=10500
---   initial conditions
IC;H=16000;AMCH=0.4;TRIM;ALP=50.
---   pause for 3 seconds
PAUSE 3.0
---   alp not equal theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_17
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;PAUSE 30;LTEST=1;      ---   anser_perf_val_17
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
LS;16=0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #18, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   PLAL & PLAR = 100%
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0001;IMXTST=10500
---   initial conditions
IC;H=16000;AMCH=0.4;TRIM;ALP=50.
---   pause for 3 seconds
PAUSE 3.0
---   alp not equal theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_18
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;PAUSE 30;LTEST=1;      ---   anser_perf_val_18
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
LS;16=0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #19, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.35
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_19
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_19
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #20, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=1
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.35
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_20
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_20
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #21, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.35
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_21
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_21
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #22, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
SI;1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=30.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.    Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_22
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_22
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #23, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=1
2;YAW=0;THROTTLE=0
1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=30.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_23
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_23
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #24, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=30.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_24
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_24
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #25, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=1.818;PA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=16000;AMCH=0.4;TRIM;ALP=50.
---   pause for 3 seconds
PAUSE 3.0
---   alp not equal theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_25
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_25
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
LS;16=0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #26, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=1
2;YAW=0;THROTTLE=0
SI;1;RRAMP=1;RDOUBLET=1
RT1=1.;RT2=1.25;RT3=3.25;RT4=3.5;RT5=3.75;RT6=5.75;RT7=6.0
RA1=2.;RA2=2.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0001;IMXTST=10500
---   initial conditions
IC;H=16000;AMCH=0.4;TRIM;ALP=50.
---   pause for 3 seconds
PAUSE 3.0
---   alp not equal theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_26
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;PAUSE 30;LTEST=1;      ---   anser_perf_val_26
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
LS;16=0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #27, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=1;THROTTLE=0
YRAMP=1;YDOUBLET=1
YT1=1.;YT2=1.25;YT3=3.25;YT4=3.5;YT5=3.75;YT6=5.75;YT7=6.0
YA1=50.;YA2=50.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   PLAL & PLAR = 100%,
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0001;IMXTST=10500
---   initial conditions
IC;H=16000;AMCH=0.4;TRIM;ALP=50.
---   pause for 3 seconds
PAUSE 3.0
---   alp not equal theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_27
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;PAUSE 30;LTEST=1;      ---   anser_perf_val_27
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
LS;16=0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #28, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=0.5;PT2=0.75;PT3=3.;PT4=3.25
PA1=4.545
RPULSE=1;RRAMPED=1
RT1=3.25;RT2=3.5;RT3=6.75;RT4=7.
RA1=1.5
2
YPULSE=1;YRAMPED=1
YT1=7.75;YT2=8;YT3=9;YT4=10
YA1=-50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 15 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=15.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=40000;AMCH=0.68
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 15 sec.  Required for Batch scripts only
---RTDW;IWRTFR=2400
---RDWPTH=anser_perf_val_28
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   operate
ALL;LTEST=1;      ---   anser_perf_val_28
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #29, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=0.5;PT2=0.75;PT3=3.;PT4=3.25
PA1=4.545
RPULSE=1;RRAMPED=1
RT1=3.25;RT2=3.5;RT3=6.75;RT4=7.
RA1=1.5
2
YPULSE=1;YRAMPED=1
YT1=7.75;YT2=8;YT3=9;YT4=10
YA1=-50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 15 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=15.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=40000;AMCH=0.68
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 15 sec.  Required for Batch scripts only
---RTDW;IWRTFR=2400
---RDWPTH=anser_perf_val_29
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_29
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #30, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=0.5;PT2=0.75;PT3=3.;PT4=3.25
PA1=4.545
RPULSE=1;RRAMPED=1
RT1=3.25;RT2=3.5;RT3=6.75;RT4=7.
RA1=1.5
2
YPULSE=1;YRAMPED=1
YT1=7.75;YT2=8;YT3=9;YT4=10
YA1=-50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=15.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=40000;AMCH=0.68
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 15 sec.  Required for Batch scripts only
---RTDW;IWRTFR=2400
---RDWPTH=anser_perf_val_30
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_30
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #31, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=7.25;PT2=7.5;PT3=8.75;PT4=9.
PA1=4.545
RPULSE=1;RRAMPED=1
RT1=.5;RT2=.75;RT3=4.75;RT4=5.
RA1=-3
2
YPULSE=1;YRAMPED=1
YT1=5.;YT2=5.25;YT3=6.25;YT4=7.25
YA1=50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 15 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=15.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.30
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 15 sec.  Required for Batch scripts only
---RTDW;IWRTFR=2400
---RDWPTH=anser_perf_val_31
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   operate
ALL;LTEST=1;      ---   anser_perf_val_31
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #32, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=7.25;PT2=7.5;PT3=8.75;PT4=9.
PA1=4.545
RPULSE=1;RRAMPED=1
RT1=.5;RT2=.75;RT3=4.75;RT4=5.
RA1=-3
2
YPULSE=1;YRAMPED=1
YT1=5.;YT2=5.25;YT3=6.25;YT4=7.25
YA1=50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 15 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=15.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.30
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 15 sec.  Required for Batch scripts only
---RTDW;IWRTFR=2400
---RDWPTH=anser_perf_val_32
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_32
---   reset
VAL;ARMREQ=0;THRINP=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #33, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=7.25;PT2=7.5;PT3=8.75;PT4=9.
PA1=4.545
RPULSE=1;RRAMPED=1
RT1=.5;RT2=.75;RT3=4.75;RT4=5.
RA1=-3
2;YPULSE=1;YRAMPED=1
YT1=5.;YT2=5.25;YT3=6.25;YT4=7.25
YA1=50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 15 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=15.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.30
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 15 sec.  Required for Batch scripts only
---RTDW;IWRTFR=2400
---RDWPTH=anser_perf_val_33
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   operate
ALL;LTEST=1;      ---   anser_perf_val_33
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #34, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
---
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=33000;AMCH=0.40
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_34
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Use the TST page to switch from TV to STV Mode at 1 second.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=0.0;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1.0;BIAS3=0.0;T1=1.0;T2=1.1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_34
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TST;RUNTST=0
SIMG1=1.0;SIMG2=1.0;SIMG3=1.0;INPG1=0.0;INPG2=0.0;INPG3=0.0
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #35, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
---
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=33000;AMCH=0.40
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_35
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Use the TST page to switch from STV Mode to S Mode at 1 second.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=0.0;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1.0;BIAS3=0.0;T1=1.0;T2=1.1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_35
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TST;RUNTST=0
SIMG1=1.0;SIMG2=1.0;SIMG3=1.0;INPG1=0.0;INPG2=0.0;INPG3=0.0
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #36, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
---
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=33000;AMCH=0.40
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_36
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 3.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Use the TST page to switch from S Mode to TV at 1 second.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=0.0;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1.0;BIAS3=0.0;T1=1.0;T2=1.1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_36
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TST;RUNTST=0
SIMG1=1.0;SIMG2=1.0;SIMG3=1.0;INPG1=0.0;INPG2=0.0;INPG3=0.0
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #37, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=0;THROTTLE=0
SI;1;PPULSE=1;PRAMPED=1
PT1=1;PT2=1.25;PT3=8.;PT4=8.25
PA1=0.2272
RPULSE=1;RRAMPED=1
RT1=2.;RT2=2.25;RT3=8.;RT4=8.25
RA1=1.
---
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.4;TRIM;ALP=15.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_37
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Use the TST page to switch from TV to STV Mode at 3 seconds.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=0.0;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1.0;BIAS3=0.0;T1=3.0;T2=3.1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_37
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TST;RUNTST=0
SIMG1=1.0;SIMG2=1.0;SIMG3=1.0;INPG1=0.0;INPG2=0.0;INPG3=0.0
IC;H=25000;AMCH=0.5
TRIM;V
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
```

DONE

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #38, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=0;THROTTLE=0
SI;1;PPULSE=1;PRAMPED=1
PT1=1;PT2=1.25;PT3=8.;PT4=8.25
PA1=0.2272
RPULSE=1;RRAMPED=1
RT1=2.;RT2=2.25;RT3=8.;RT4=8.25
RA1=1.
---
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.4;TRIM;ALP=15.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_38
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   STV Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Use the TST page to switch from STV to S Mode at 3 seconds.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=0.0;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1.0;BIAS3=0.0;T1=3.0;T2=3.1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_38
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TST;RUNTST=0
SIMG1=1.0;SIMG2=1.0;SIMG3=1.0;INPG1=0.0;INPG2=0.0;INPG3=0.0
IC;H=25000;AMCH=0.5
TRIM;V
SI;1;PITCH=0;ROLL=0
```

```
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #39, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=0;THROTTLE=0
SI;1;PPULSE=1;PRAMPED=1
PT1=1;PT2=1.25;PT3=8.;PT4=8.25
PA1=1.818
RPULSE=1;RRAMPED=1
RT1=2.;RT2=2.25;RT3=8.;RT4=8.25
RA1=1.0
---
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.4;TRIM;ALP=15.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_39
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   S Mode
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
PAUSE 5.0
RFCSMODE=1;PAUSE 1.0;RFCSMODE=0
---   Use the TST page to switch from S to TV Mode at 3 seconds.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=0.0;SIMG2=0.0;SIMG3=0.0;INPG1=1.0;INPG2=1.0;INPG3=1.0
BIAS1=0.0;BIAS2=1.0;BIAS3=0.0;T1=3.0;T2=3.1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_39
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TST;RUNTST=0
SIMG1=1.0;SIMG2=1.0;SIMG3=1.0;INPG1=0.0;INPG2=0.0;INPG3=0.0
IC;H=25000;AMCH=0.5
```

```
TRIM;V
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #40, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
---
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model ON, (lstrake = 1)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=1
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=18.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_40
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Use the TST page to switch from TV to STV Mode
---   at 1 second and from STV to S Mode at 2 seconds.
TST;RUNTST=1
---   Rfcsmode is the input variable, send input ahead of the Ada.
VARIABLE=RFCSMODE;4
---   Ajust gains and Bias
SIMG1=0.0;SIMG2=0.0;SIMG3=0.0;SIMG4=0.0
INPG1=1.0;INPG2=1.0;INPG3=1.0;INPG4=1.0
BIAS1=0.0;BIAS2=1.0;BIAS3=0.0;BIAS4=1.0
T1=1.0;T2=1.1;T3=2.0;T4=2.1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_40
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
TST;RUNTST=0
SIMG1=1.0;SIMG2=1.0;SIMG3=1.0;INPG1=0.0;INPG2=0.0;INPG3=0.0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #41, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.35
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_41
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Dail-A-Gain option 1
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_41
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #42, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=30.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_42
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Dail-A-Gain option 1
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_42
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #43, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   PLAL & PLAR = 100%
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=16000;AMCH=0.4;TRIM;ALP=50.
---   pause for 3 seconds
PAUSE 3.0
---   alp not equal theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_43
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Dail-A-Gain option 1
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_43
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
LS;16=0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #44, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=0.5;PT2=0.75;PT3=3.;PT4=3.25
PA1=4.545
RPULSE=1;RRAMPED=1
RT1=3.25;RT2=3.5;RT3=6.75;RT4=7.
RA1=1.5
2
YPULSE=1;YRAMPED=1
YT1=7.75;YT2=8;YT3=9;YT4=10
YA1=-50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 15 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=15.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=40000;AMCH=0.68
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=2400
---RDWPTHanser_perf_val_44
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Dail-A-Gain option 1
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_44
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #45, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=7.25;PT2=7.5;PT3=8.75;PT4=9.
PA1=4.545
RPULSE=1;RRAMPED=1
RT1=.5;RT2=.75;RT3=4.75;RT4=5.
RA1=-3
2
YPULSE=1;YRAMPED=1
YT1=5.;YT2=5.25;YT3=6.25;YT4=7.25
YA1=50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 15 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=15.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.30
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=2400
---RDWPTH=anser_perf_val_45
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Dail-A-Gain option 1
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_45
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #46, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.35
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_46
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Dail-A-Gain option 2
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_46
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #47, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=35000;AMCH=0.4;TRIM;ALP=30.
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_47
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Dail-A-Gain option 2
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_47
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #48, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=0
2;YAW=0;THROTTLE=0
1;PRAMP=1;PDOUBLET=1
PT1=1.;PT2=1.25;PT3=3.25;PT4=3.5;PT5=3.75;PT6=5.75;PT7=6.0
PA1=2.727;PA2=2.5
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   PLAL & PLAR = 100%
THRINP=0;THRSET=1;PLALIC=100;PLARIC=100
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 8 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=8.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=16000;AMCH=0.4;TRIM;ALP=50.
---   pause for 3 seconds
PAUSE 3.0
---   alp not equal theta
LS;16=1
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=1280
---RDWPTH=anser_perf_val_48
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Dail-A-Gain option 2
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_48
---   reset
VAL;ARMREQ=0;THRINP=1;THRSET=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
TRIM;V
IC;H=25000;AMCH=0.5
LS;16=0
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #49, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=0.5;PT2=0.75;PT3=3.;PT4=3.25
PA1=4.545
RPULSE=1;RRAMPED=1
RT1=3.25;RT2=3.5;RT3=6.75;RT4=7.
RA1=1.5
2
YPULSE=1;YRAMPED=1
YT1=7.75;YT2=8;YT3=9;YT4=10
YA1=-50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 15 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=15.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=40000;AMCH=0.68
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=2400
---RDWPTH=anser_perf_val_49
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Dail-A-Gain option 2
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_49
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

```
---   HIL Script for ANSER Performance Validation checkout.
---   Checkcase #50, March 8, 1995 PJC
---
---   Time dependent setting of stick, pedal, and throttle
SI;1;PITCH=1;ROLL=1
2;YAW=1;THROTTLE=1
SI;1;PPULSE=1;PRAMPED=1
PT1=7.25;PT2=7.5;PT3=8.75;PT4=9.
PA1=4.545
RPULSE=1;RRAMPED=1
RT1=.5;RT2=.75;RT3=4.75;RT4=5.
RA1=-3
2
YPULSE=1;YRAMPED=1
YT1=5.;YT2=5.25;YT3=6.25;YT4=7.25
YA1=50
TDOUBLET=1;TRAMPED=1
TT1=.5;TT2=.75;TT3=11.;TT4=11.25;TT5=11.5;TT6=13.75;TT7=14.
TA1=100.;TA2=28.
---   Turn Off multiplier on asymmetric nose term for high AOA
UX;45=0
---   trim with stick trim and set stick gain for 701E
VAL;TRIMDEP=1;DEPGAIN=-0.05
---   use max hinge moments in McAir's Sim listing
LX;49=0
---   use other values for s*1 for LEF & aileron h.m.
LX;12=0
---   skip hinge moment calculations
LX;1=1
---   Turn off Cockpit Interface Unit (CIU)
---   Time in operate mode 15 sec
---   PLAL = PLAR, (thrlck = 1)
---   Nose Strake Actuator Model OFF, (lstrake = 0)
VAL;LCIU=0;TIMOP=15.0;THRLCK=1;LSTRAKE=0
---   Prevent inadvertent input from the stick quadrant.
BYPASS=1
---   set up trim loop
TRMMAX=0.0005;IMXTST=7500
---   initial conditions
IC;H=25000;AMCH=0.30
---   Pause for 5 seconds to allow the 701E to trim so RFCS will engage
PAUSE 5.0
SC;READ=anser
---   Set record length to 8 sec.  Required for Batch scripts only
---RTDW;IWRTFR=2400
---RDWPTH=anser_perf_val_50
---RTINIT=1;RTWRIT=1
---
---   set RFCS 150.0 stick gain
VAL;DEPGAIN=-0.005
---   arm and engage rfcs
ARMREQ=1
PAUSE 3.0
ZRMENG=1
---   TV Mode
---   Dail-A-Gain option 2
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
RFCSGAIN=0;PAUSE 0.5;RFCSGAIN=1
---   operate
ALL;LTEST=1;      ---   anser_perf_val_50
---   reset
VAL;ARMREQ=0;BYPASS=0;LCIU=1;DEPGAIN=-0.05
IC;H=25000;AMCH=0.5
SI;1;PITCH=0;ROLL=0
2;YAW=0;THROTTLE=0
DONE
```

Appendix D

ANSER VALIDATION ISSUES AND DISCUSSION

HARV ANSER Performance Validation Issue Status - May 25, 1995

Issue	Description	Checkcases	Action	Status
– Control Laws –				
1. Lateral sensitivity with Ny delay.	Delays of 100 ms in Ny cause a 2 Hz mode to appear in some of the responses. This discrepancy was first observed in the HIL checkcases and duplicated in Batch.	22, 23	Modified Lateral/Directional Gains. CCR 829	Closed
2. Lateral sensitivity around 40 ° AOA.	Delays in system could result in large directional commands.	1,4,7 10,13,16 19,22,25	Modified Lateral/Directional Gains. CCR 829	Closed
3. Lateral sensitivity during tracking.	DMS tracking tasks with stepping target results in degraded HQR's.	DMS Tracking Tasks	Modeled Signal Selection (SS) logic on DMS and determined lateral tracking is not PIO prone.	Closed
4. Strake non-linear gearing.	Strake actuator model includes non-linear gearing, not accounted for in ANSER L/D control laws.	OBES maneuvers	Add inverse non-linear gearing to strake commands.	Closed
5. OBES maneuvers.	OBES maneuvers programmed in Ada needed adjustments due to cross channel pedal gain changes.	OBES maneuvers	Redefined OBES maneuvers in Spec.	Closed
– Batch Sim –				
1. Add capability to run SS logic effects on lateral stick.	Added in LaRC Batch simulations and on the DMS.	All Lateral Input Runs	Added in control law interface as an option.	Closed
2. Ada vs Fortran Checks.	Slight cross coupling difference noted between Ada and Fortran comparisons.	2, 11, 20	Differences are negligible and probably caused by Fortran implementation.	Closed
3. Ability to turn OFF hinge moment model.	Need ability to turn OFF hinge moment model in Batch to run same set up as the HIL which does not have a strake hinge moment model included in SAM.	All L/D Input Runs	Added in Rel. 12	Closed
4. Disengage to 701E does not reset Dial-a-Gain.	Dail-a-Gain should be reset to 0 (Default) after every 701E disengagement.	41 - 50	Fixed in Rel. 12	Closed
5. OBES scripts.	Using OBES scripts in batch sim have shown that the strakes need to be deployed 1 time before OBES maneuvers that deploy strakes will work.	OBES maneuvers	Fixed in Rel. 12	Closed

251

6. High AOA scripts	Using a high AOA script first after the sim is brought up will result in a theta = -180° condition and no trim can be made.	All High AOA trims	Move setting of LS(9)	Closed
7. OBES maneuver 18 repeats	OBES input keeps repeating.	OBES maneuver 18	Fixed in Rel. 12	Closed
8. PLA trim at 30° AOA	1st script run after batch sim is brought up produces a trim PLA different than the 2nd run using the exact same script.	All 30° AOA Trims	Only a problem for AOA not equal to THETA.	Closed
– SW sim –				
– HIL sim –				
1. 2 Hz mode.	A 2 Hz mode becomes apparent in S mode only around 30 - 40° AOA.	22, 23	Duplicated in batch using 4 frames delay in Ny. Accounted for SS logic and qc difference in HIL. Closed with CCR 828.	Closed
2. Large directional control commands around 40° AOA.	All longitudinal-input-only checkcases show a large discrepancy in the lateral/directional axes at 40° AOA.	1, 4, 7 10, 13, 16 19, 22, 25	Duplicated in batch using 4 frames delay in Ny. Accounted for SS logic and qc difference in HIL. Closed with CCR 829.	Closed
3. Lateral stick command rate limit.	In Iron Bird run 23a it was apparent that the stick command rate limit for step inputs was different between Batch and the HIL	23a	Ada code changed to reflect Spec change.	Closed
4. No Trailed-Damp (TD) model in HIL.	No TD model was added and NO strake hinge moments are modeled in SAM.	N/A	Cannot use HIL for TD tests.	Open
5. 20 Hz buzz in strake commands.	Signal selection logic balancing produces a 20 Hz oscillation in RFCS stick and strake commands.	All Lateral Input Runs	Duplicated in batch using SS stick.	Open
6. Pitch command limit.	A pitch command greater than 5 inches is possible in the HIL due to the SS logic.	28, 29, 30 31, 32, 33 44, 45, 49, 50	Added a position limiter on PSGTOT to limit pitch stick command to +5/-2.5 inches.	Closed

7. Pitch stick in HIL.	Pitch stick inputs will be incorrect in the HIL since a 1.1 multiplier was added to the ANSER control laws to model the magnitude of the stick observed in flight.	All longitudinal Inputs	Work around for scripts involves dividing by 1.1. HIL piloted sim incorrect as currently configured.	Open
8. Strake Actuator Model (SAM)	SAM model rate limit results in HIL do not match Batch.	All STV & S mode checkcases	SAM gain adjustments made at Dryden.	Open
9. Leading Edge Flap (LEF) Discrepancies.	Obseved a differential LEF command in HIL.	19	Under investigation	Open
10. Impact pressure difference between Batch and HIL.	Impact pressure differences in HIL result in different longitudinal trims in Batch vs. HIL. This causes time history differences for longitudinal input checkcases.	All	Product of the Hardware scaled within 1% of total range.	Closed
11. Rudder rate limit.	Rate limit 75 °/sec with hinge moments turned OFF. Batch sim has RL of 56 °/sec.	All L/D Input Runs	Changed Batch sim NO Load Rate Limit to 75 °/sec.	Closed
12. Stabilator position limits.	Stabilator negative position limits on the HIL are -25° instead of -24°.	All longitudinal	Needs to be investigated in hardware.	Open
13. Strake command differences between HIL runs.	Strake commands have been found to disagree between HIL runs on the order of 1-2 degrees.	AOA 15 - 20°	Investigated and understood.	Closed
14. Noise observed in pitch jet commands.	Noise appears on pitch jet commands for lateral stick and pedal input checkcases. Not due noise on Qc since Qc is filtered.	8, 9, 17, 18, 21, 26, 27	Open loop analysis lead to the conclusion that noise from pitch stick was the driver.	Closed
15. Impact Pressure Transition.	Transition between Airdata (ADC) and Mission Computer (MC) parameters occur at different times between Batch and HIL.	6, 19,46, 49	Batch and HIL trim slightly different and at 30° AOA cause different transition times between ADC and MC.	Closed
16. Surface Rate Limits.	HIL surface deflections show different no load rate limits versus Batch.	All	Document rate limits from all surface deflections using HIL data.	Closed Action Item
17. Measure time delays in all sensed inputs	Large delays in sensed inputs exist compared to batch.	All	Document delays from all input signals from HIL data.	Closed Action Item

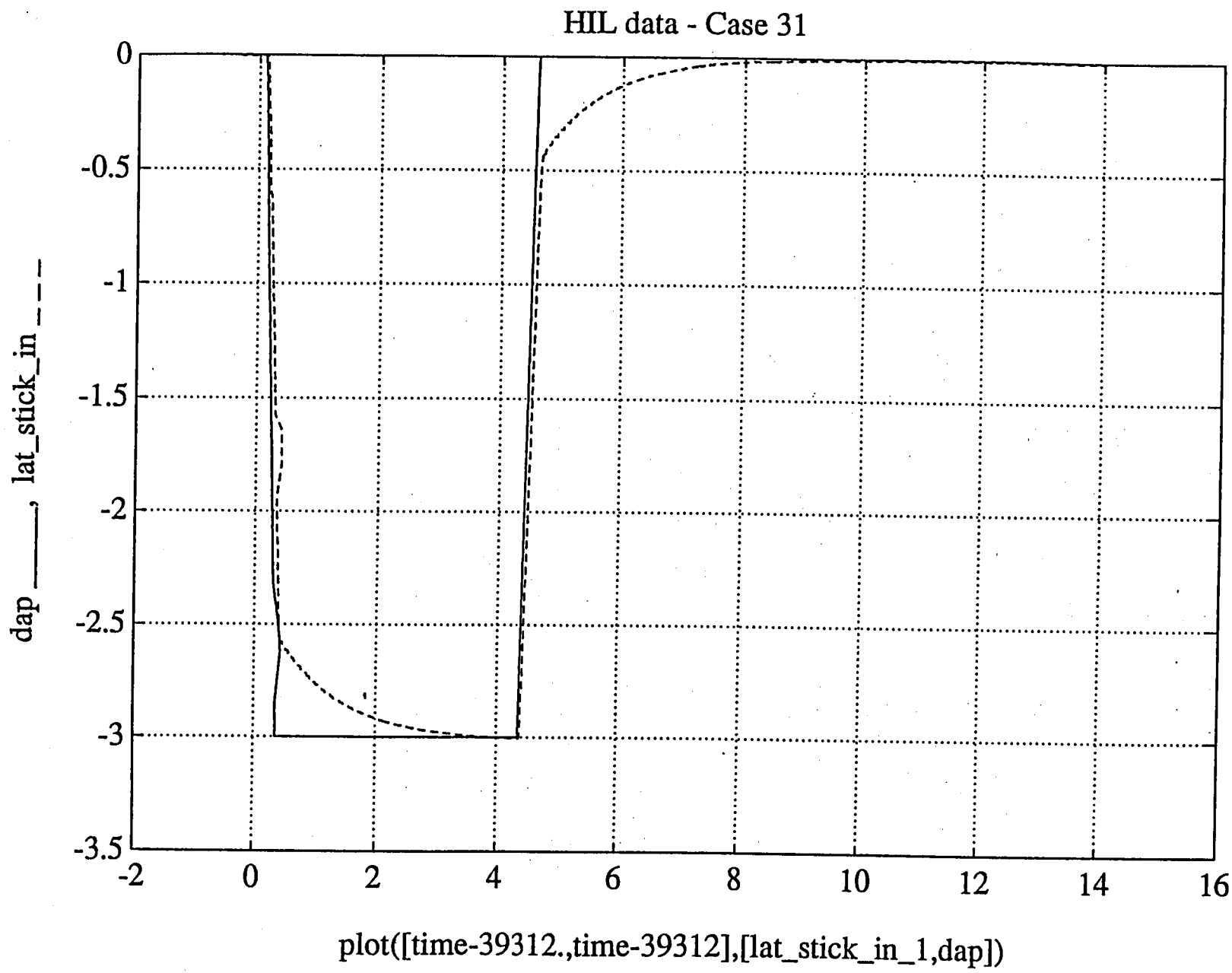
Batch Simulation Issues

1 - Lateral Stick Signal Selection Logic

A well known difference between batch and Hardware-In-the-Loop (HIL) simulations noted during the NASA-1A performance validation testing was the effect of the signal selection logic on the lateral stick input. One way of negating this effect is to rerun the batch simulation using the recorded lateral stick after the signal selection logic as the lateral stick input. This is a time consuming process, needless to say, since the batch sim gets run twice. As an alternative, a first order lead-lag filter was developed and shown to successfully model the signal selected lateral stick.

Figure 1 shows the lateral stick input (DAP) and the signal selected lateral stick (LAT_STICK_IN) for checkcase 31. Figure 2 shows these same parameters from flight number 257. The signal selection logic not only impacts the HIL but has been seen from the F-18/HARV flight data as well. In Figure 3 the lead-lag filter models for both the flight data and HIL results are presented. Figure 4 and 5 show the signal selection lateral stick versus the output from the lead-lag filter for both the HIL and flight data results respectively. Concern was noted that the HIL filter design would not work for other lateral stick input magnitudes other than that from checkcase 31. As a test of robustness 4 separate HIL runs were analyzed with each using different lateral stick magnitudes. The results of the HIL signal selected lateral stick versus the batch lateral stick run through the first order lead-lag filter model are shown in Figure 6. A good match has been found to always occur between batch and HIL when using this filter. This eliminates one of the most significant differences observed between batch and HIL runs.

Figure 1- Batch Sim Issue 1



151

Figure 2 - Batch Sim Issue 1

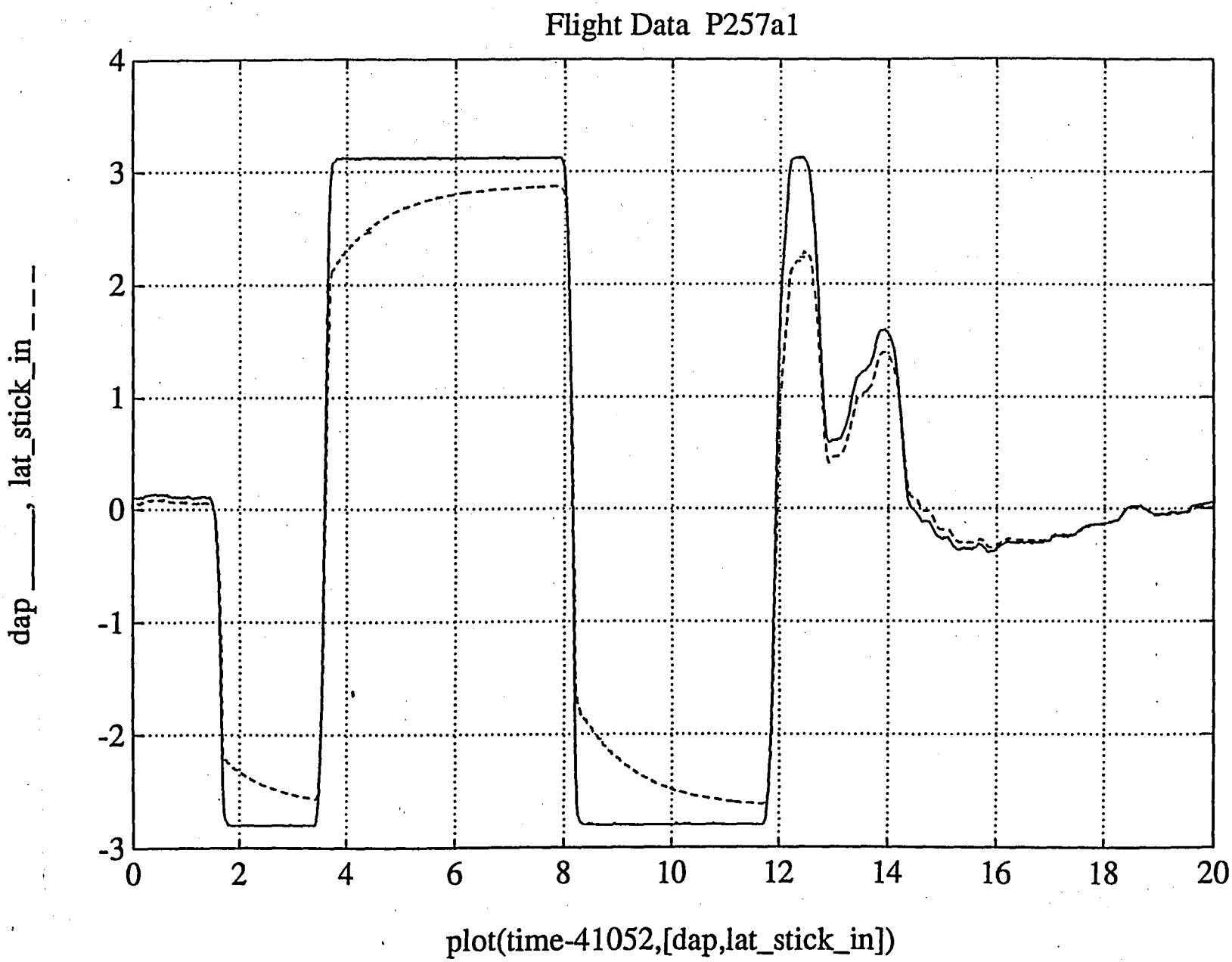


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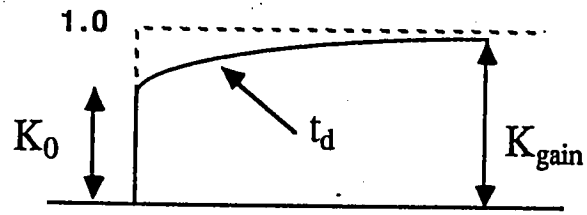
Figure 3 - Batch Sim Issue 1

Model of Stick Selection Logic



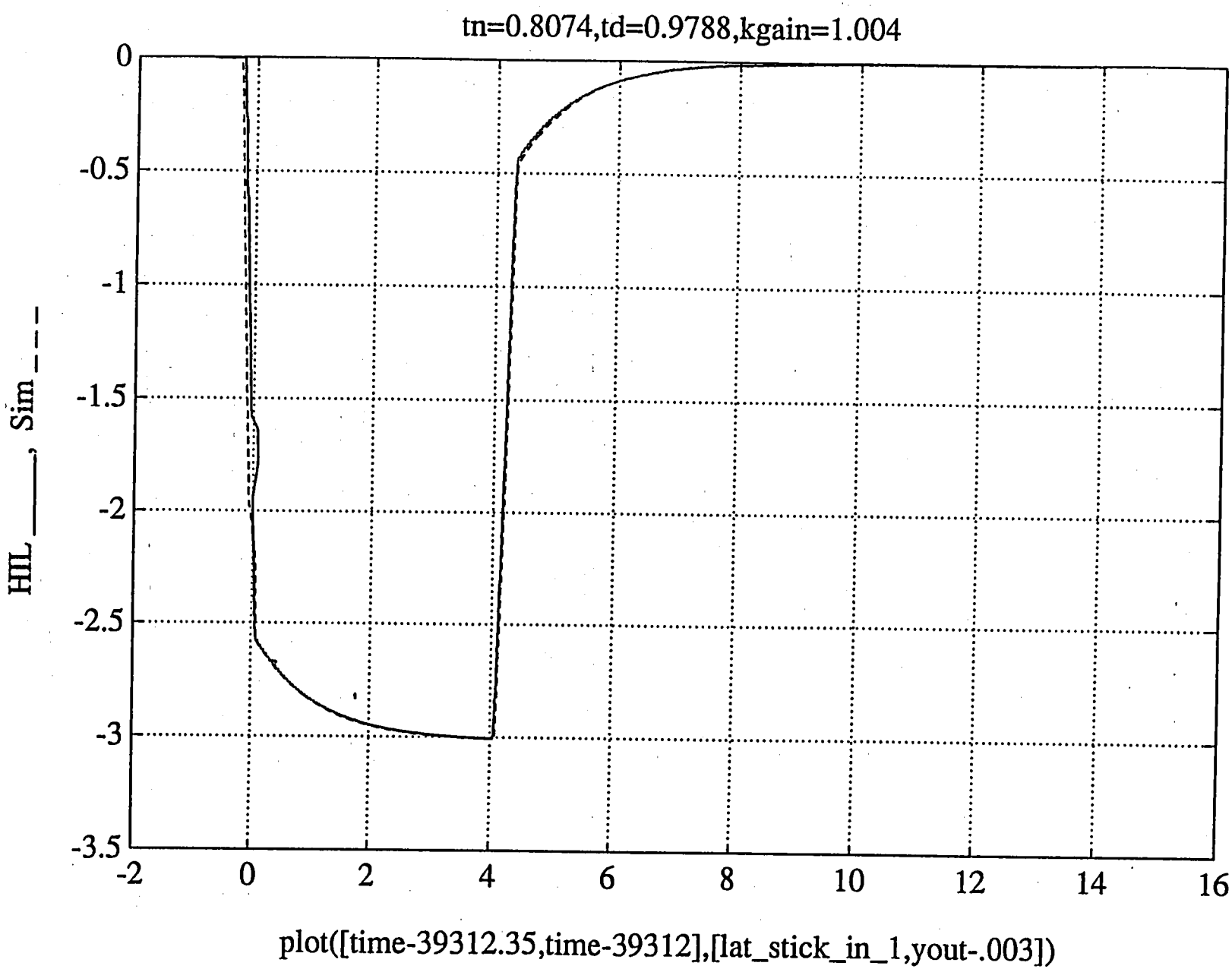
$$K_{gain}\,\frac{t_n\,s\,+\,1}{t_d\,s\,+\,1}$$

	Flight P257a1	HIL 31	Ideal
t_d, secs time constant	1.0125	0.9788	–
t_n, secs time constant	0.8415	0.8074	–
K_{gain} Steady-State Gain	0.9320	1.0040	1.0
K_0 Initial Gain	0.7746	0.8282	1.0

$$K_0 = K_{gain}\,(t_n/t_d)$$

2-27-95

Figure 4 - Batch Sim Issue 1



157

Figure 5 - Batch Sim Issue 1

0.8415 1.0125

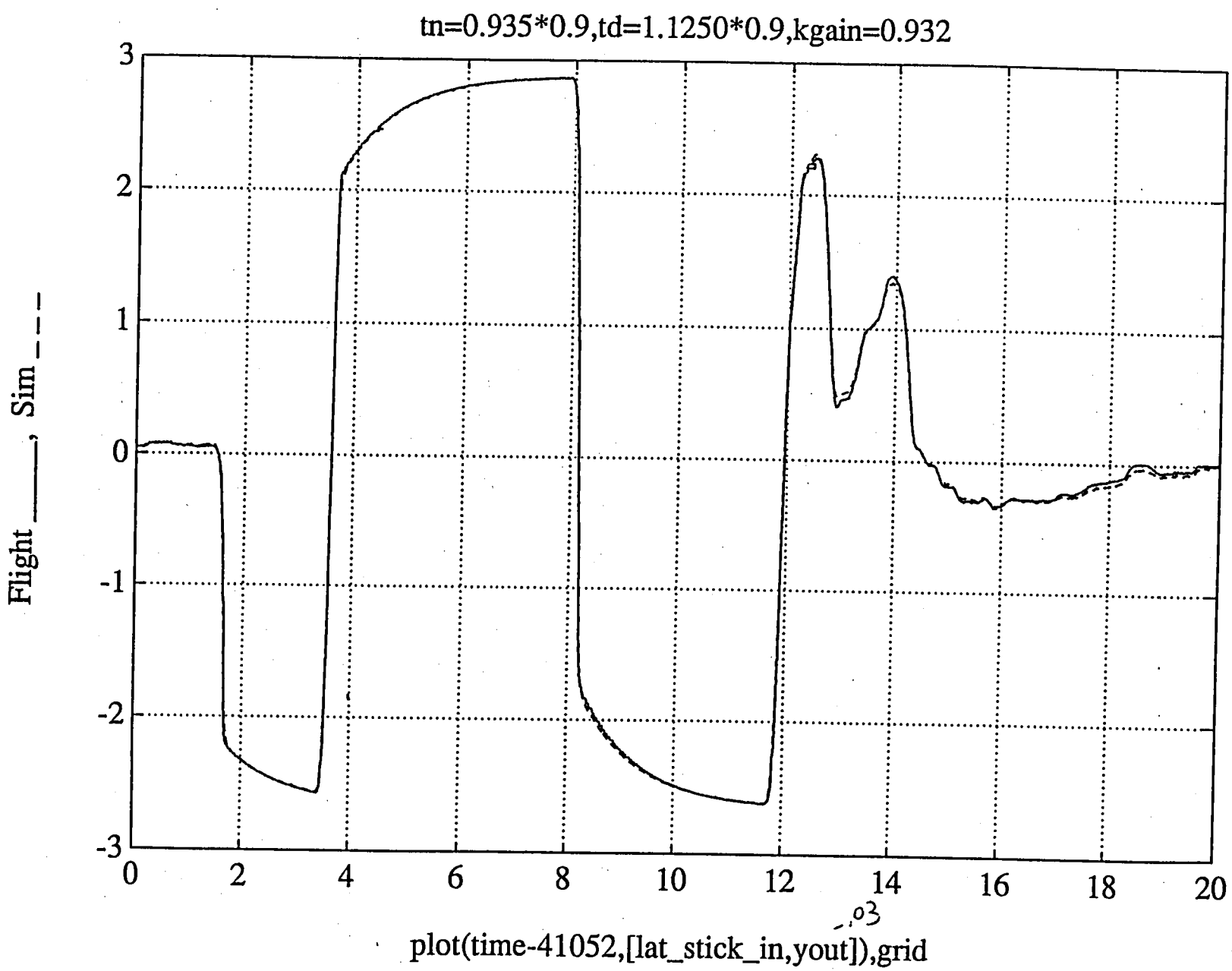
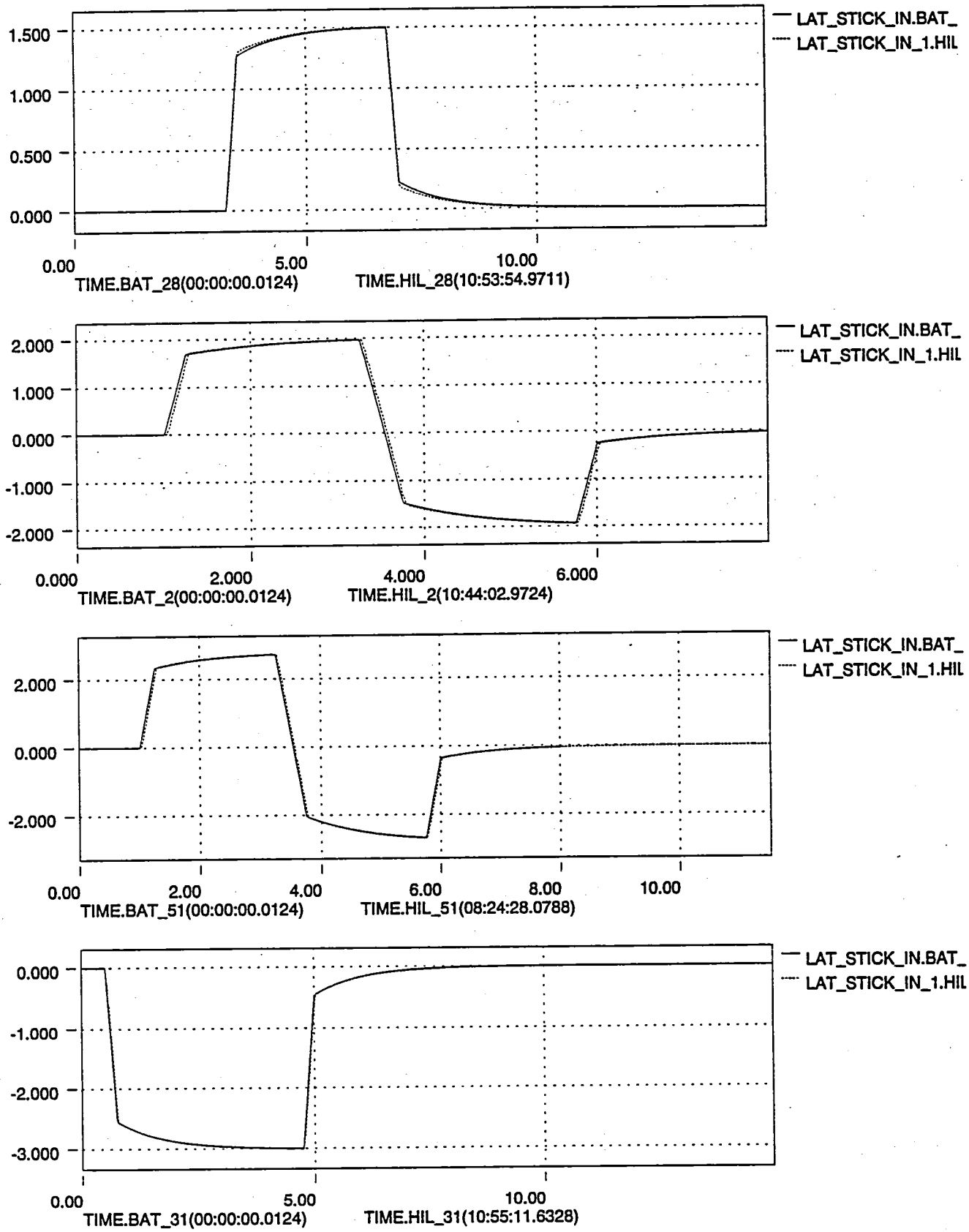


Figure 6 - Batch Sim Issue 1

Tue Feb 28 15:25:23 1995



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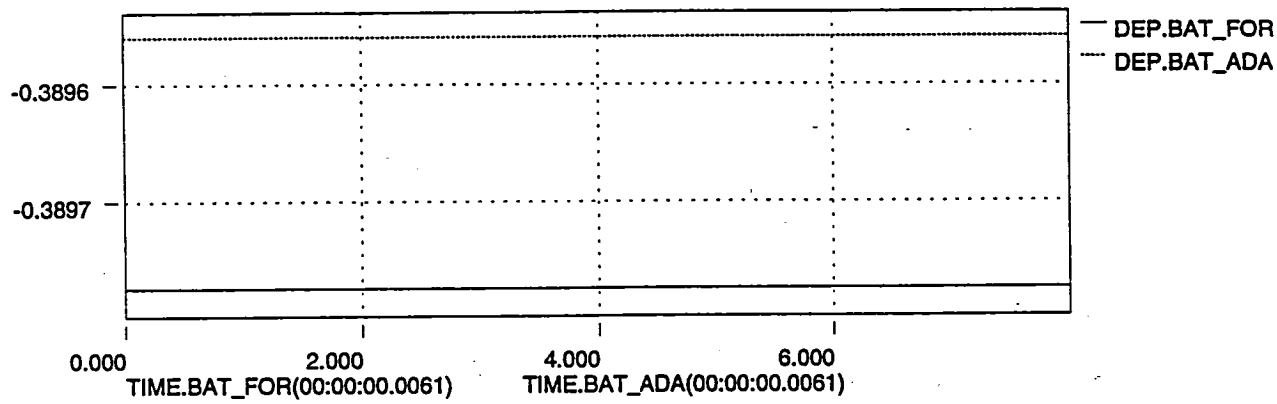
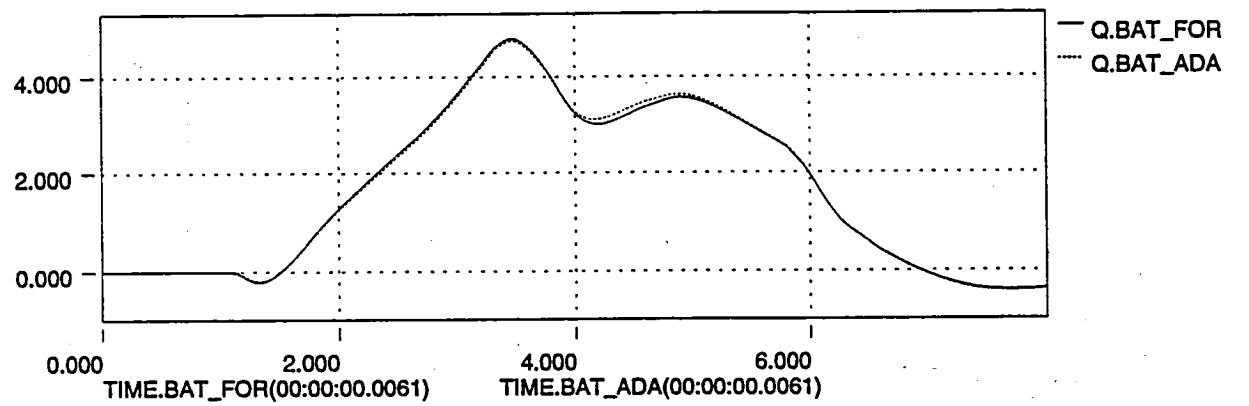
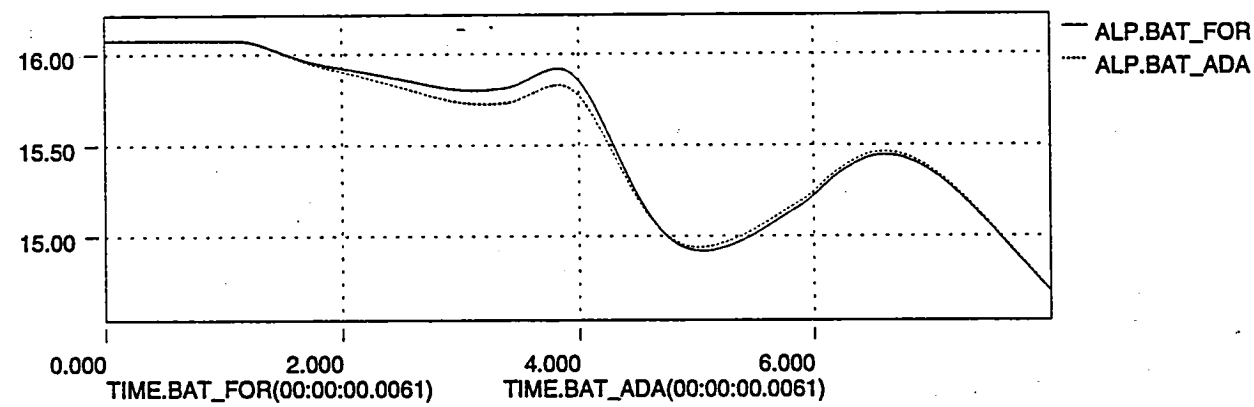
2 - Ada versus Fortran Checks

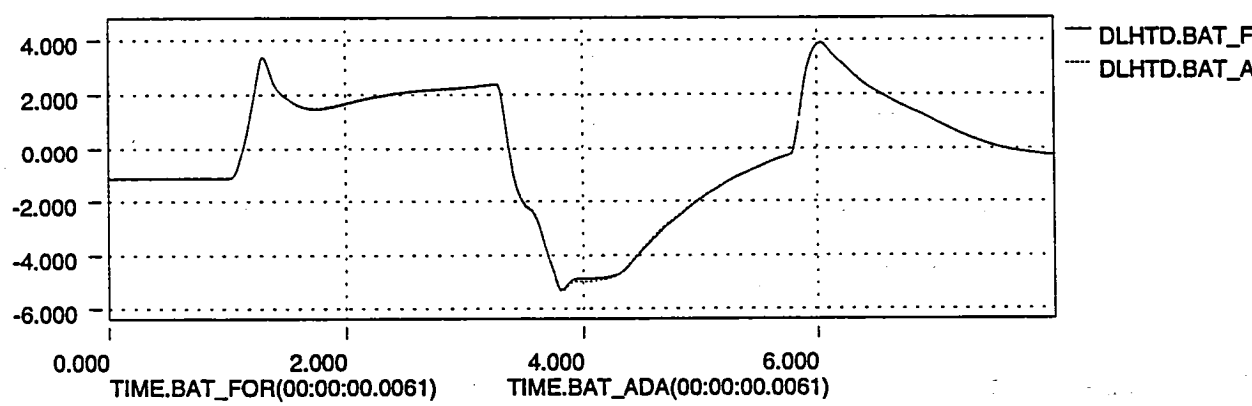
The first step in the performance validation process consists of running checkcases for both the Fortran Autocode and Ada coding of the ANSER control laws using the batch simulation. Comparisons are made between these separate closed loop runs to help identfy coding differences between the 2 coding implementations. Generally excellent results have been achieved and most differences have been resolved. Three lateral stick doublet checkcases have shown very small differences in the pitch responses that could not be resolved due to coding differences. These differences are on the order of 0.1 degrees AOA at most. Open loop analysis was performed and did not identfy any coding errors. Figure 1 contains plots between Ada and Fortran for checkcase 2. Small differences show up on AOA, but the lateral/directional do not show much of a discrepancy.

An explanation for this difference could be due to partitioning of the control system architecture. The Fortran autocode is not partitioned to spread out the control law calculations over a 16 frame 160 Hz clock like the Ada code.









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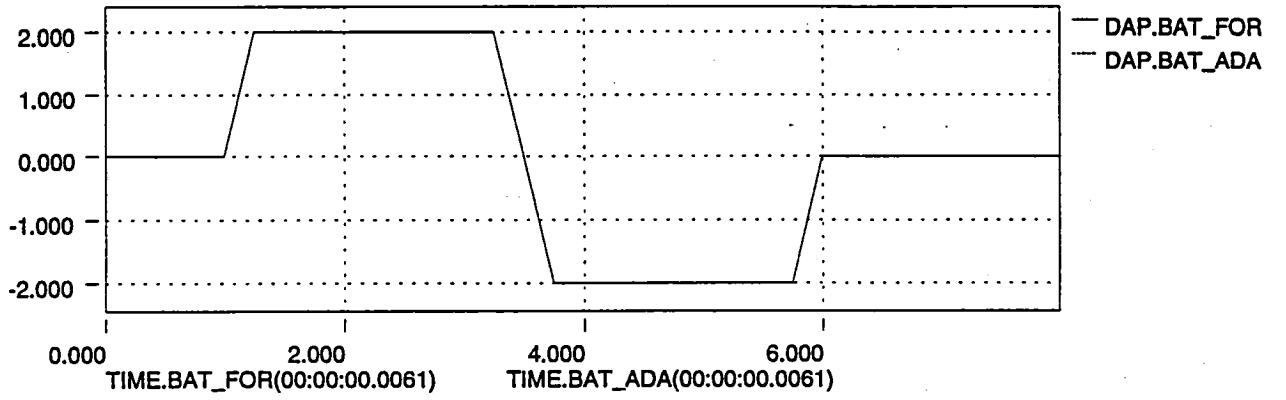

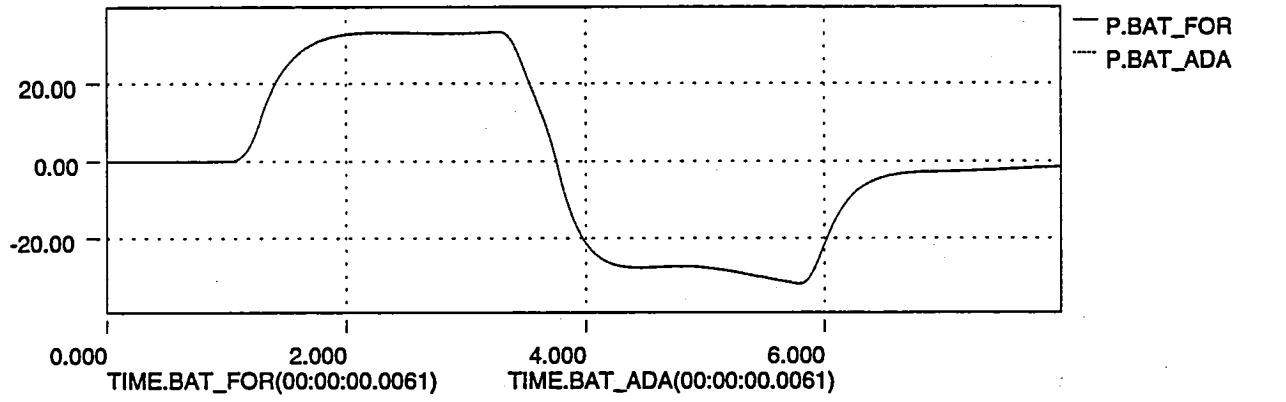

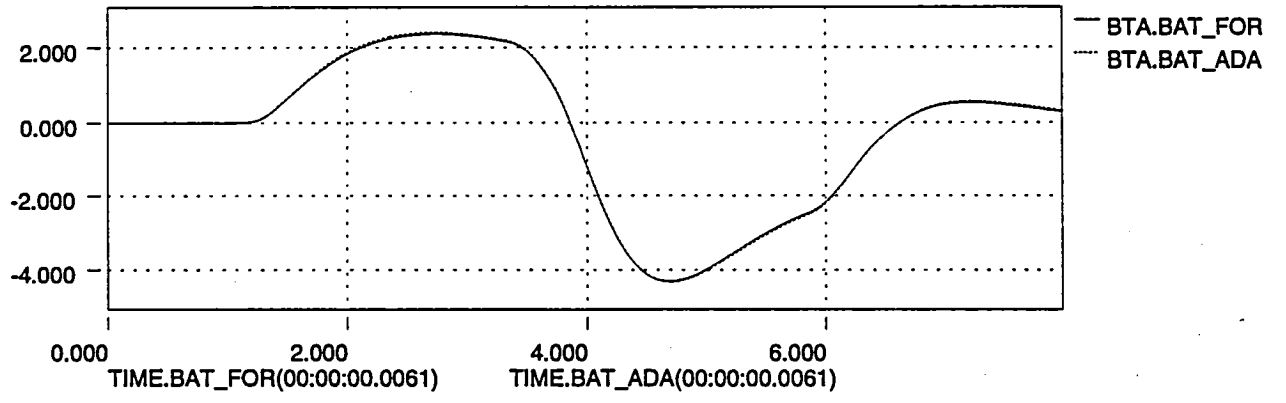

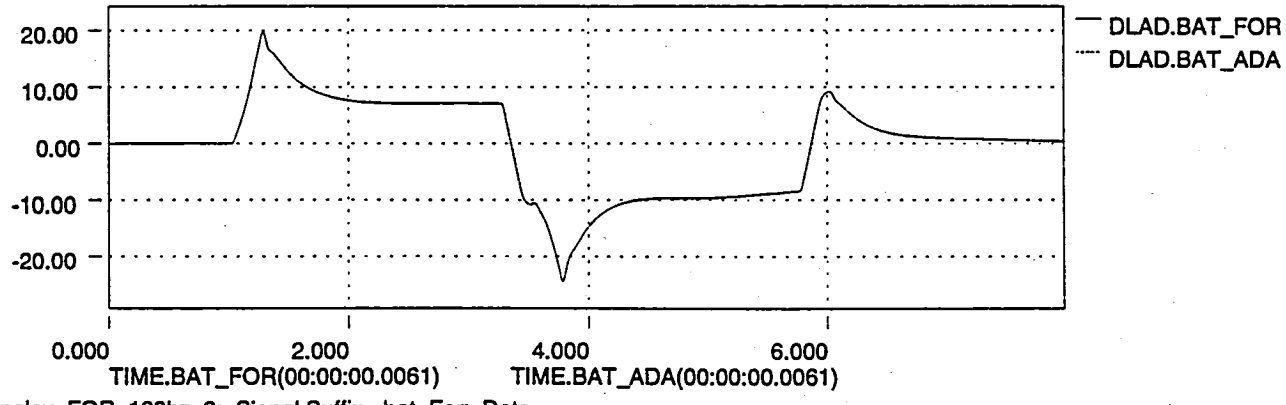

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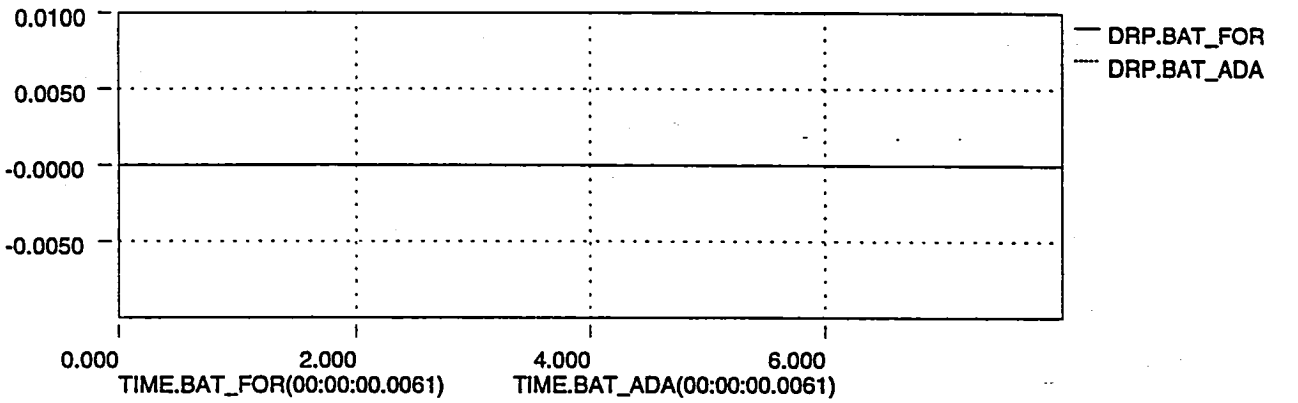

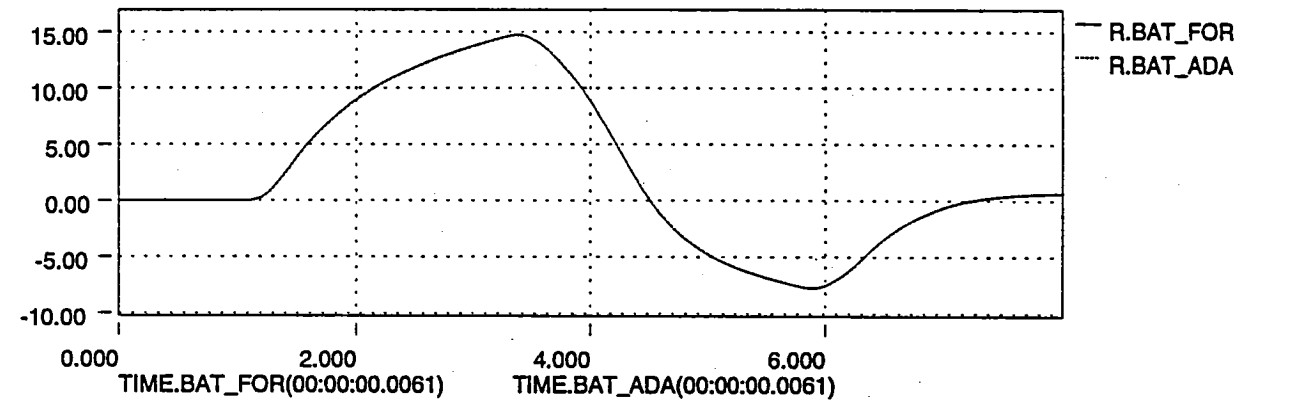

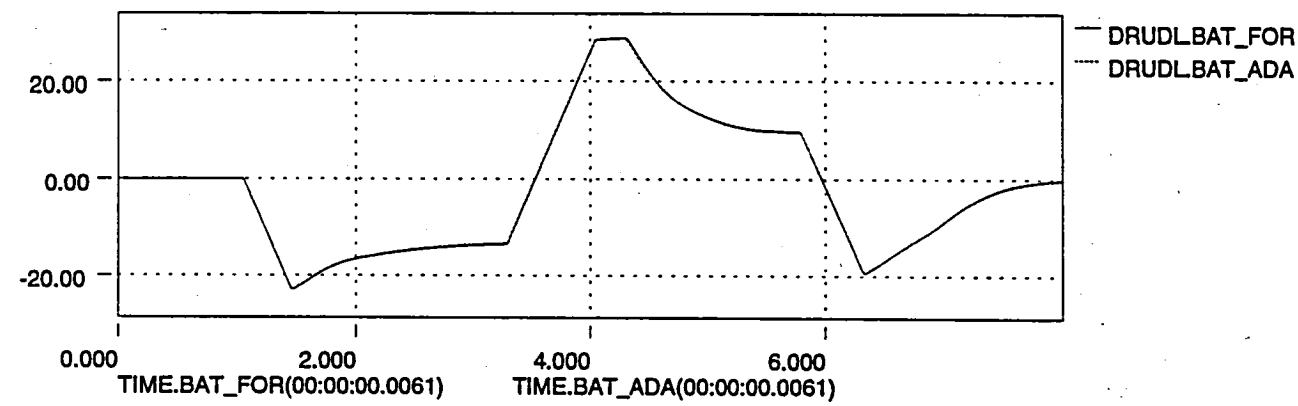

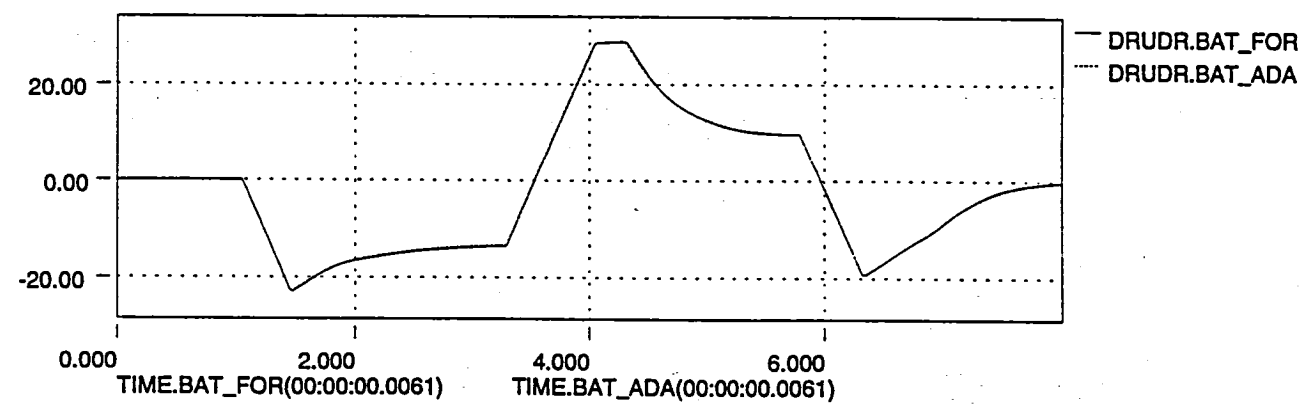

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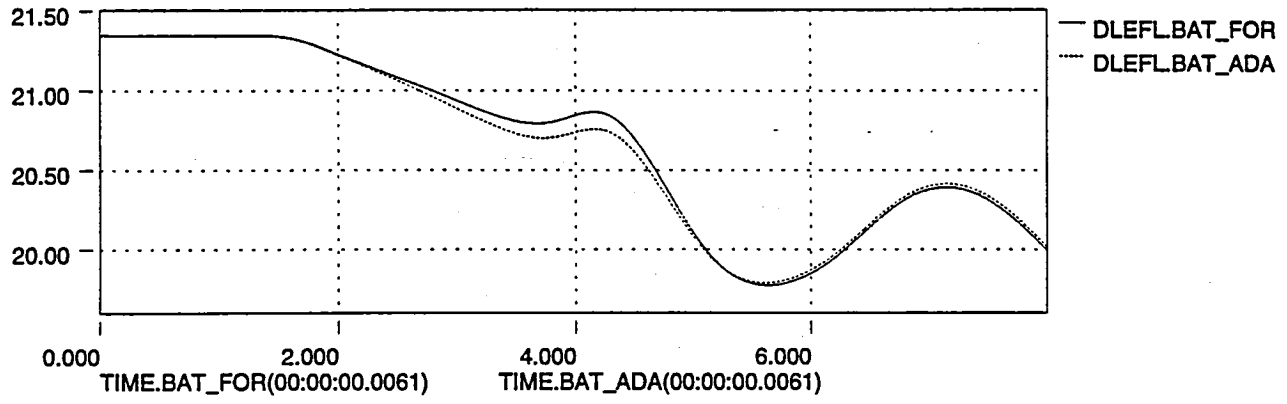

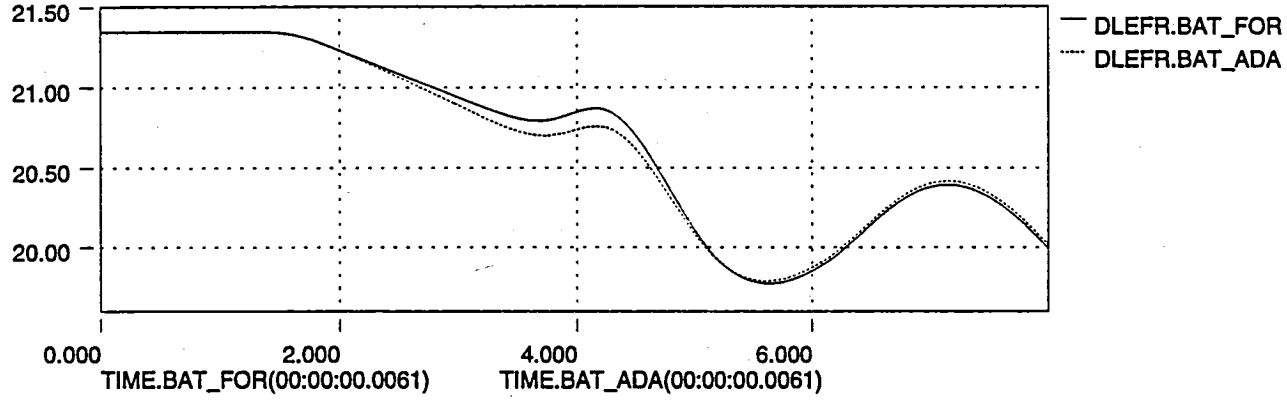

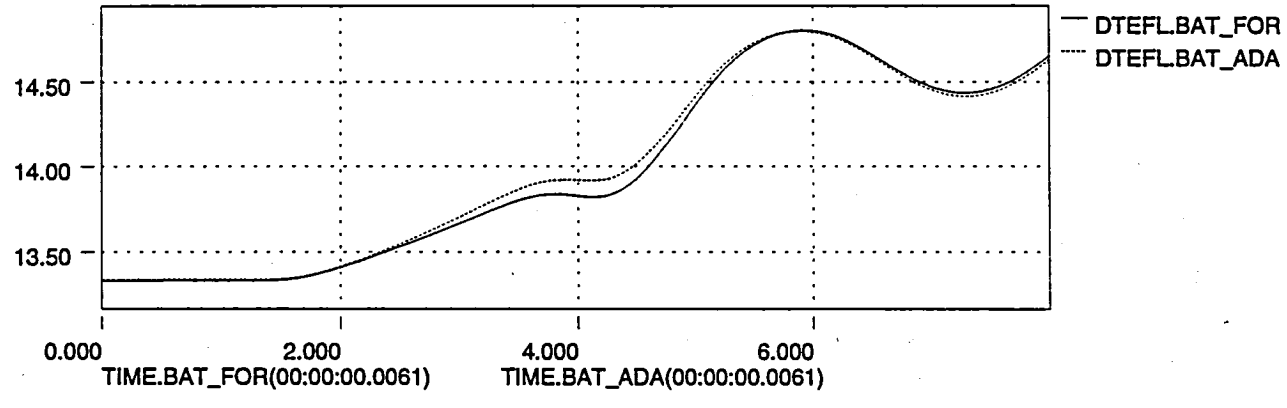

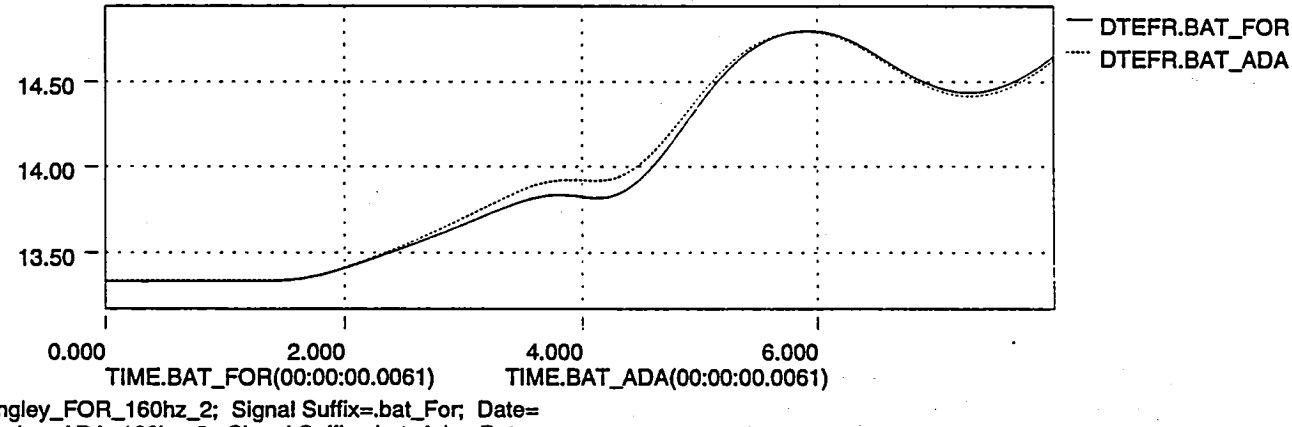

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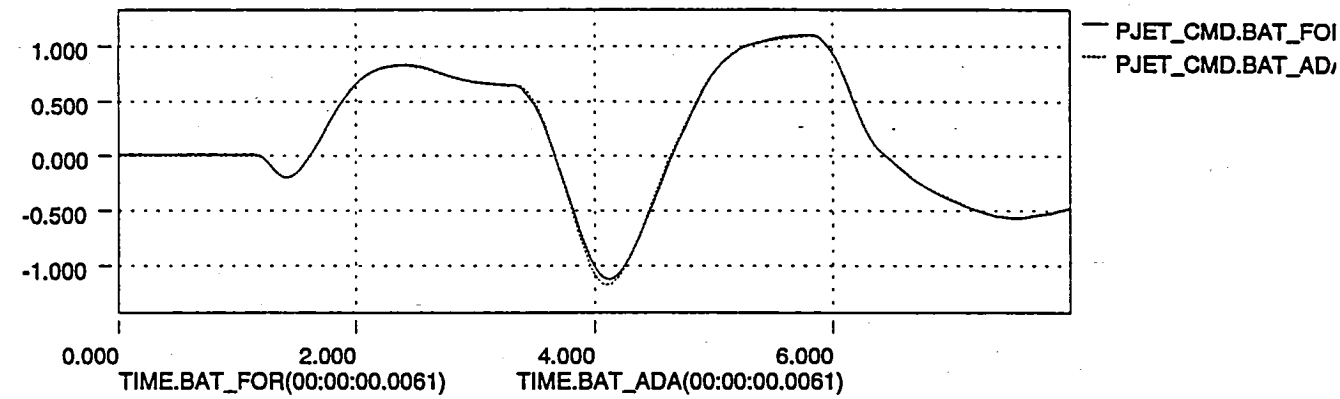

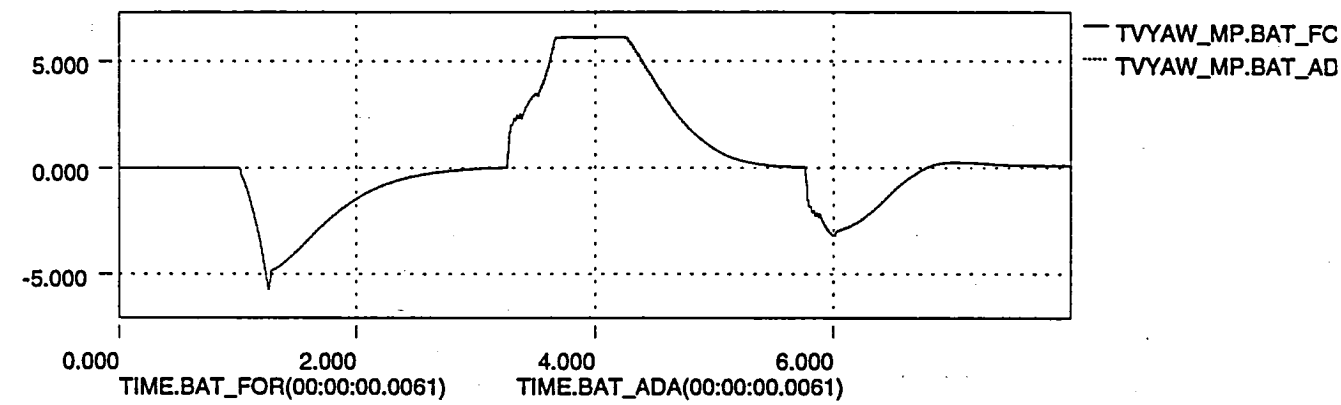

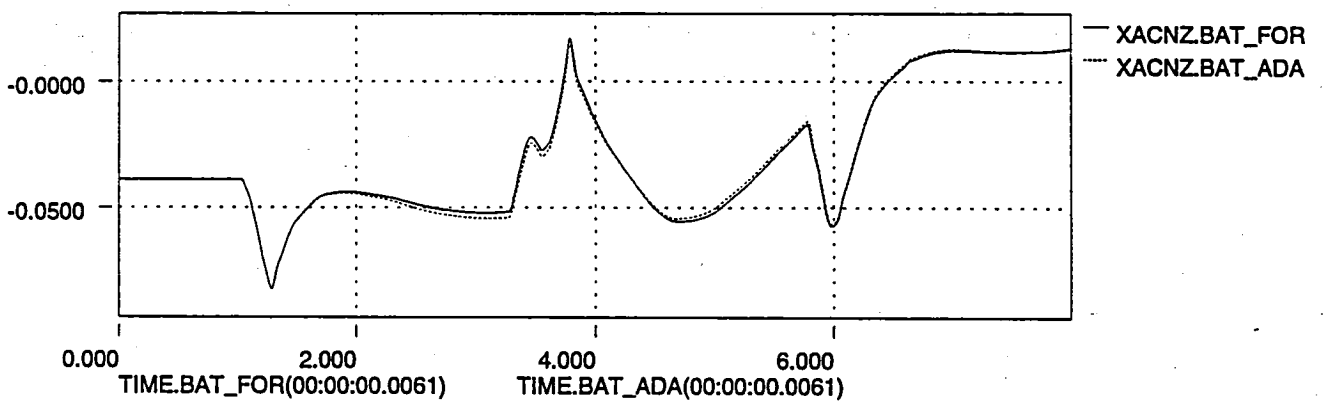

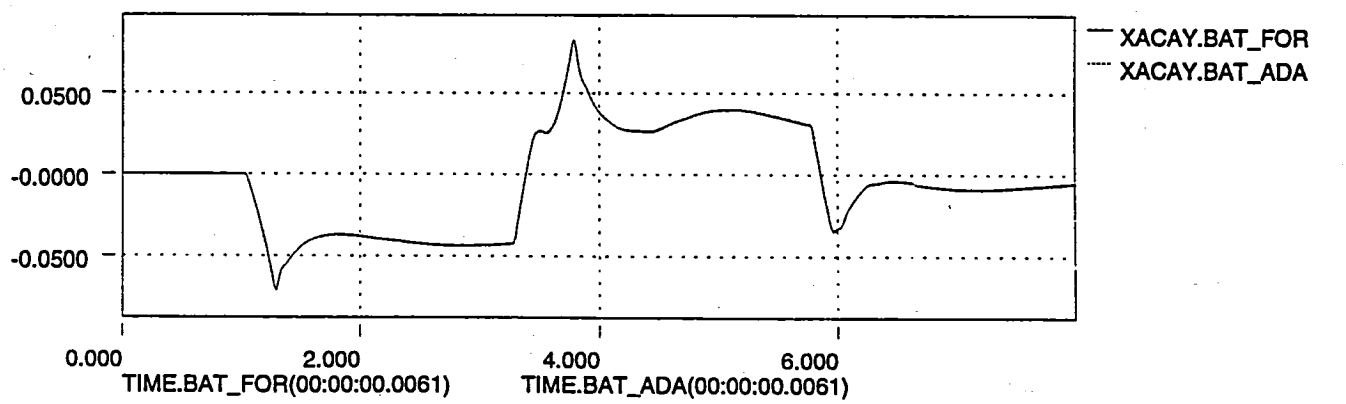

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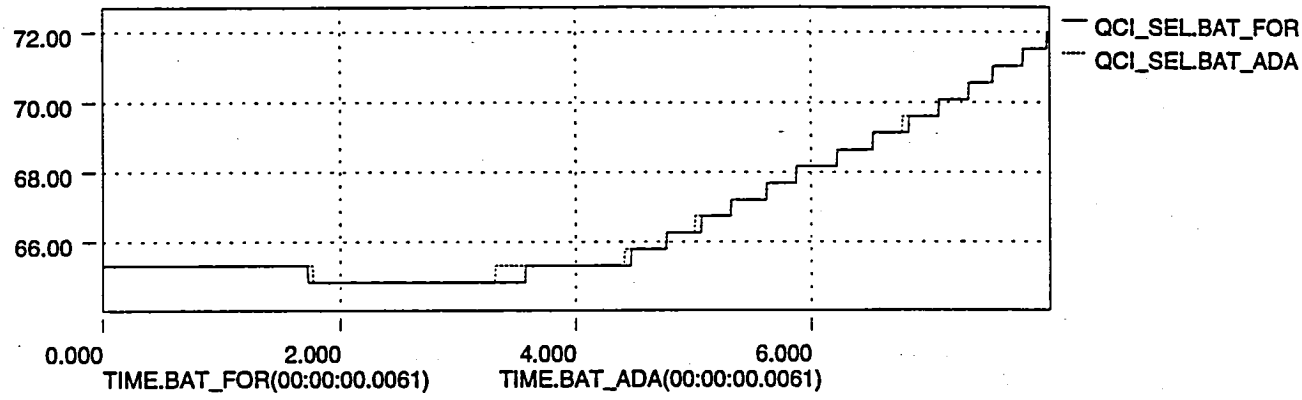

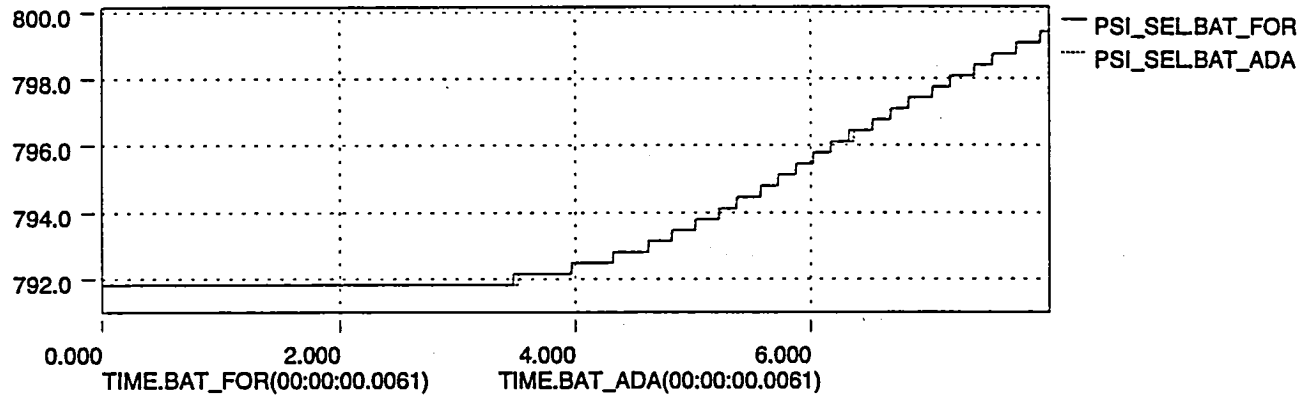

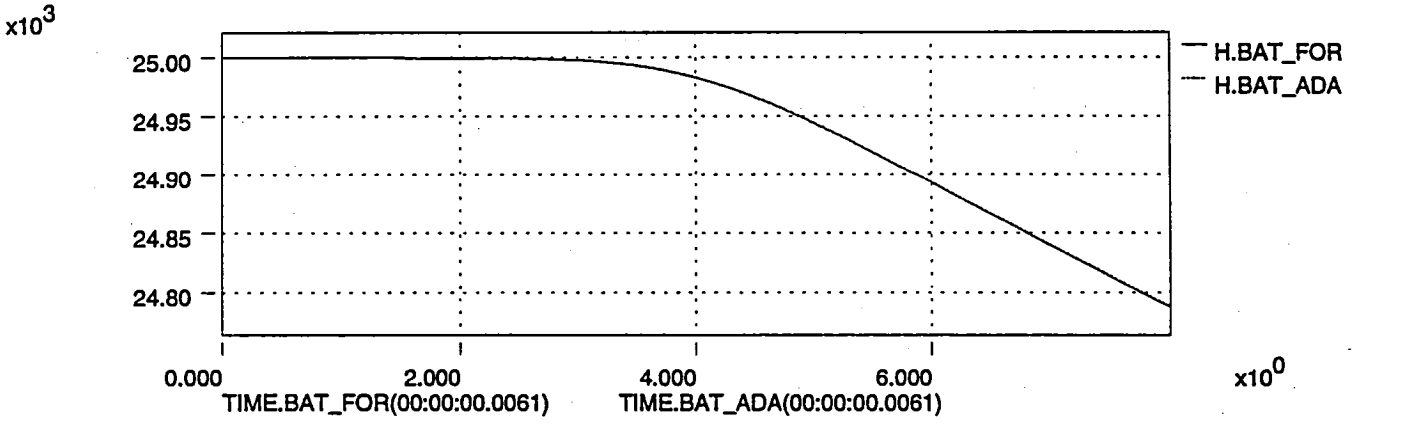

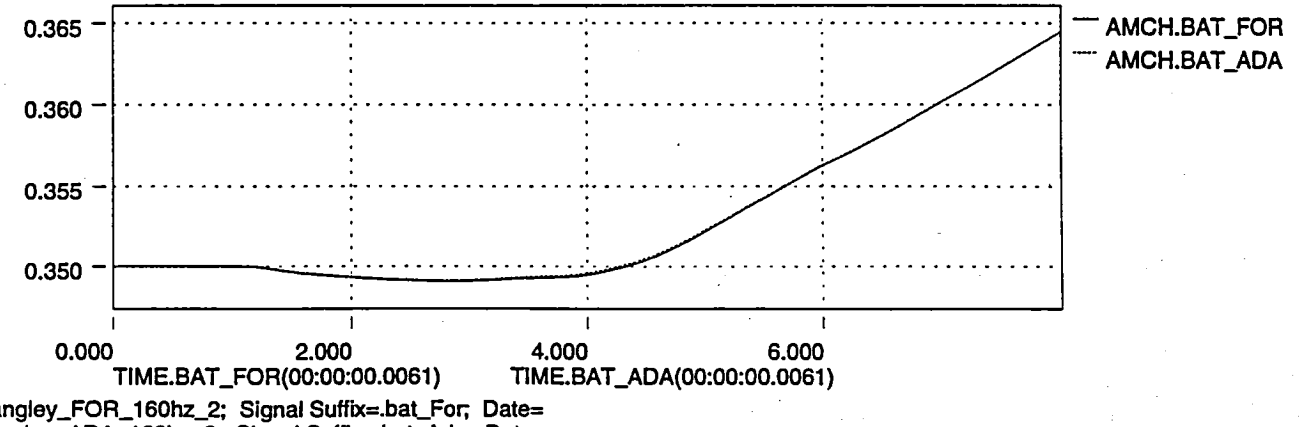

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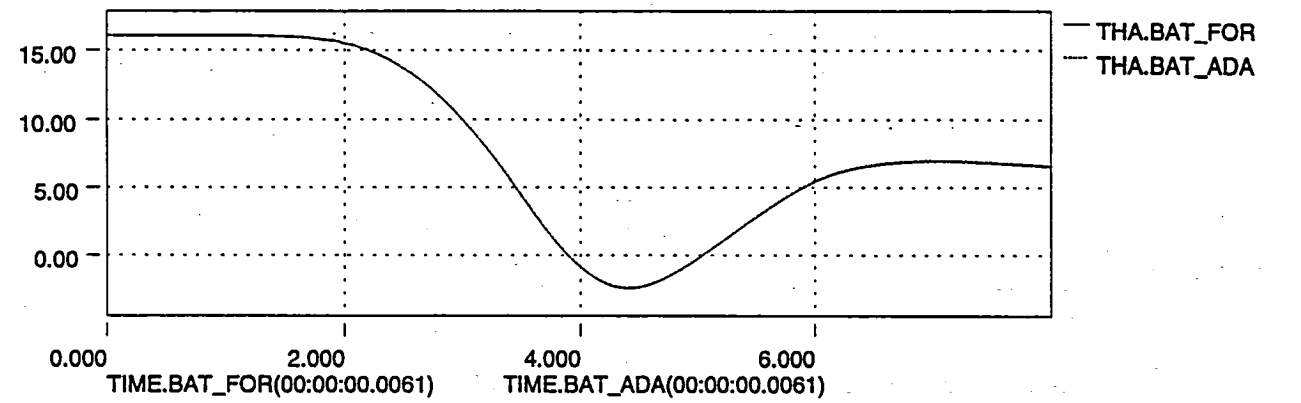

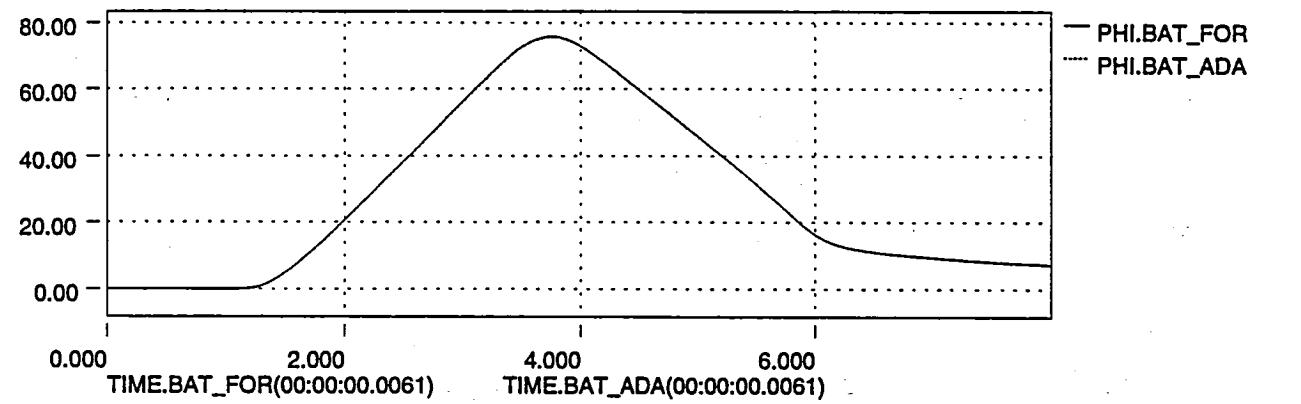

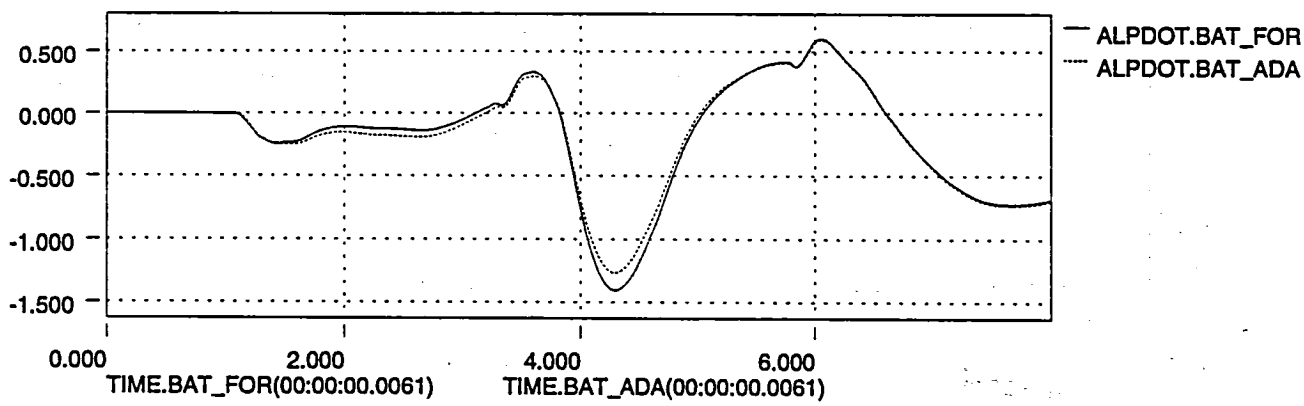

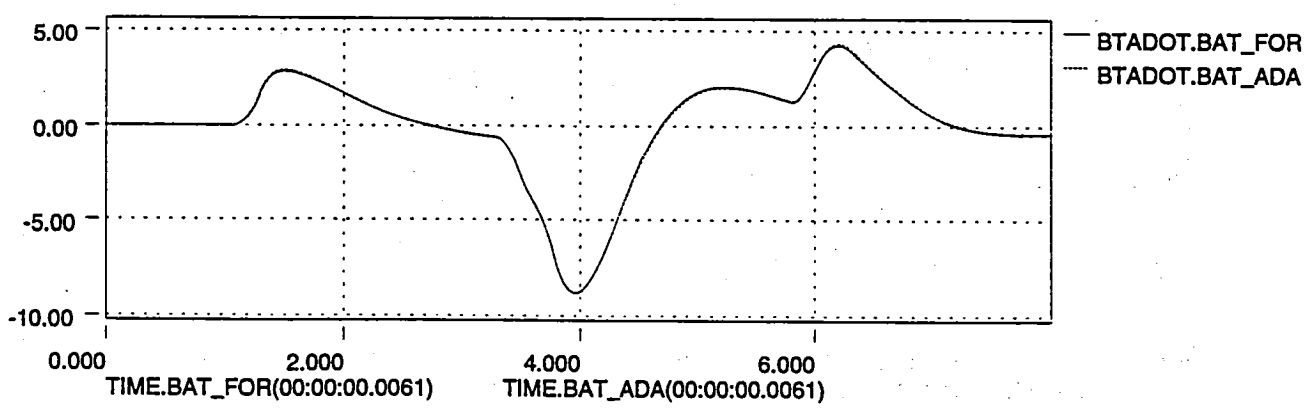

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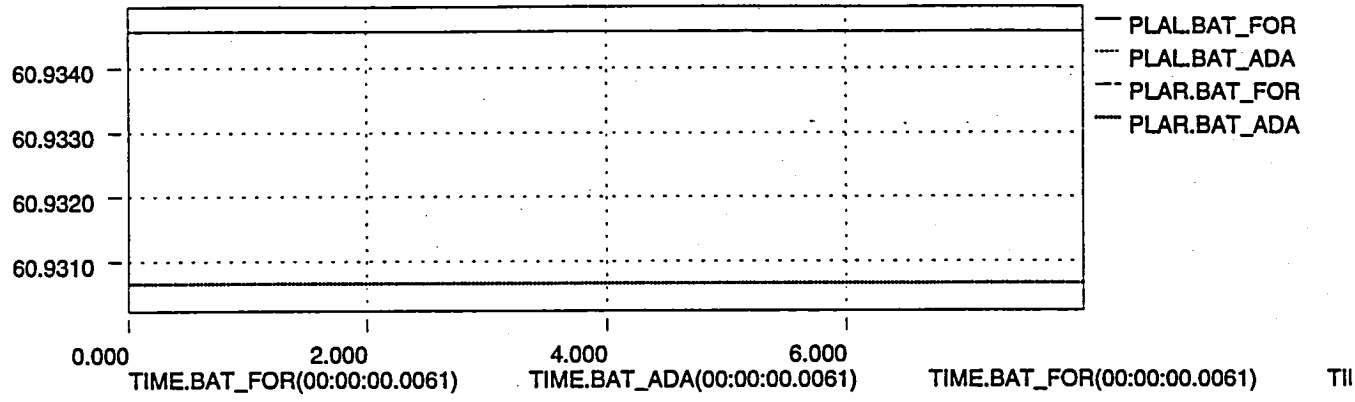

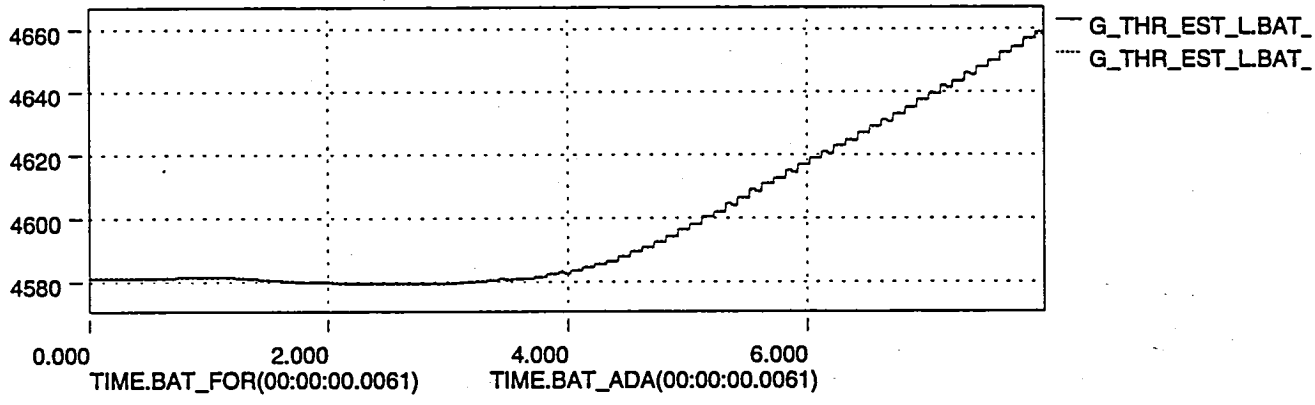

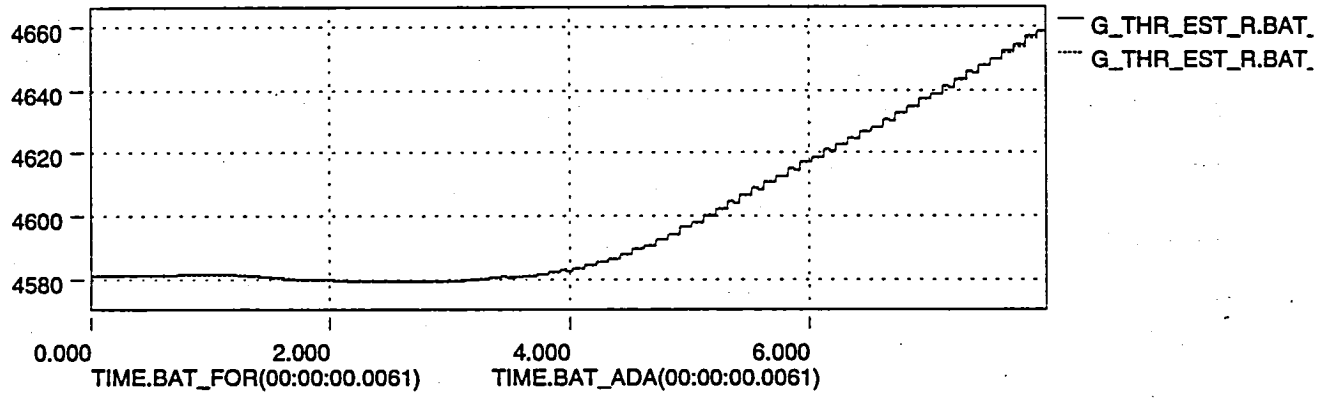

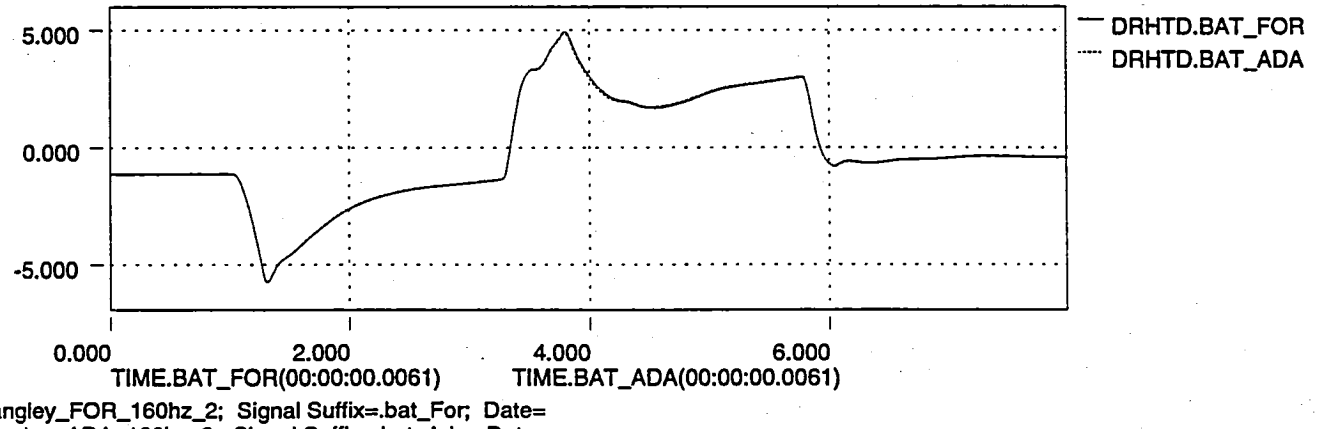

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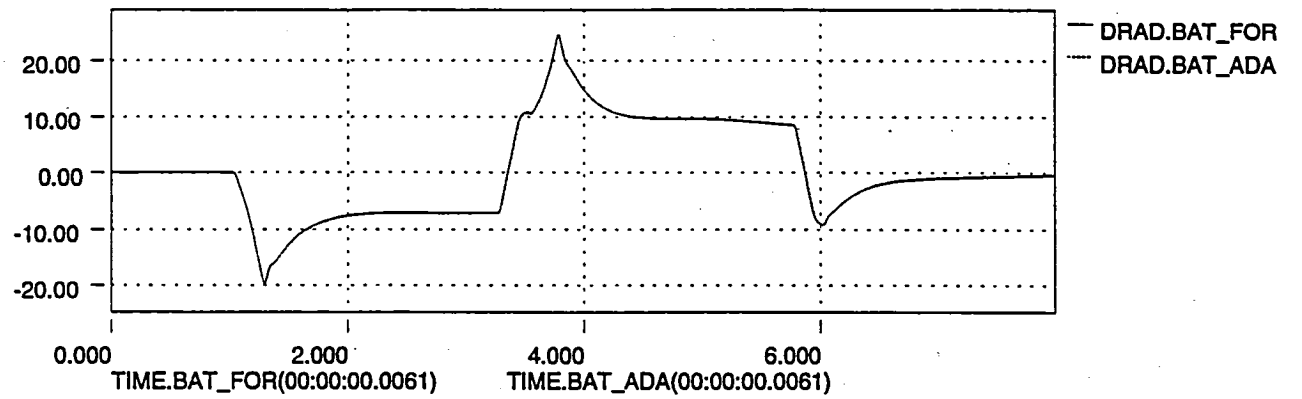

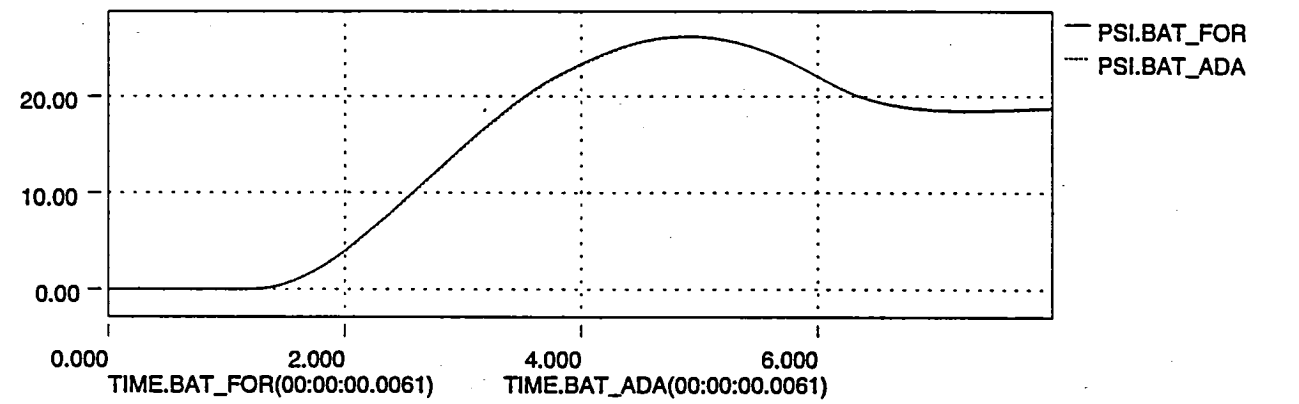

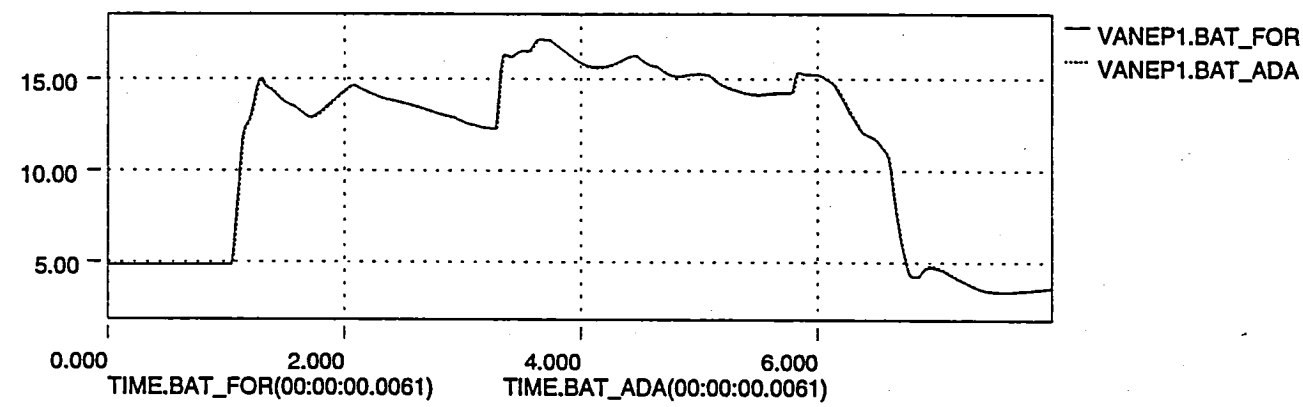

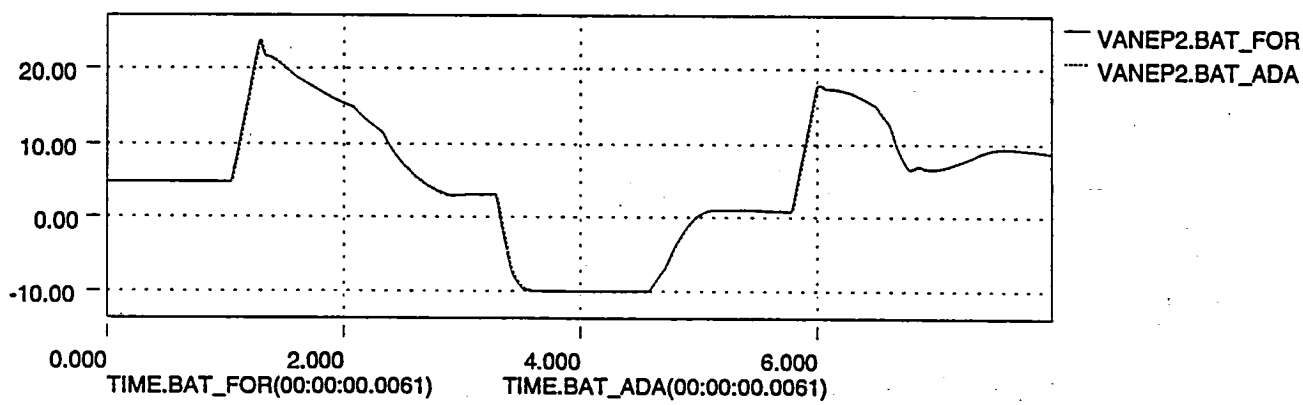

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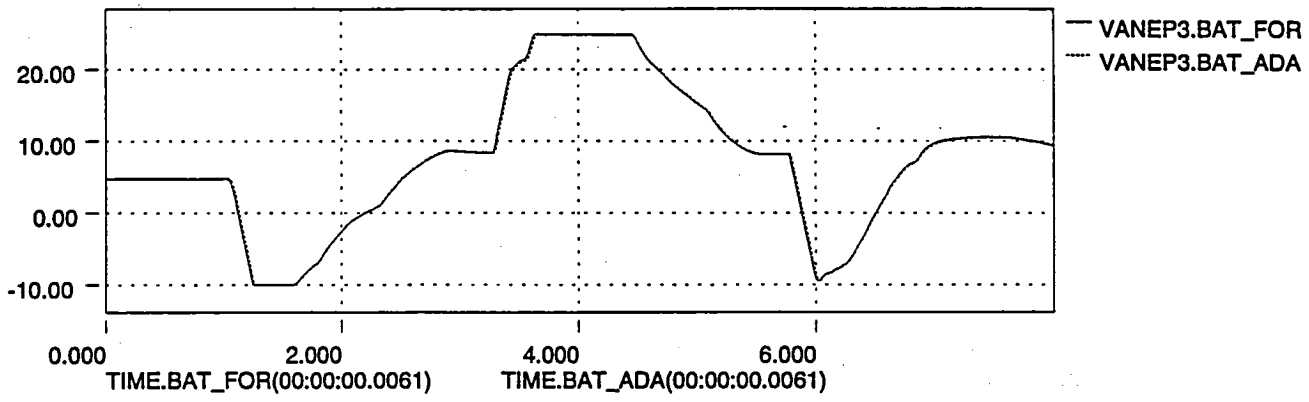

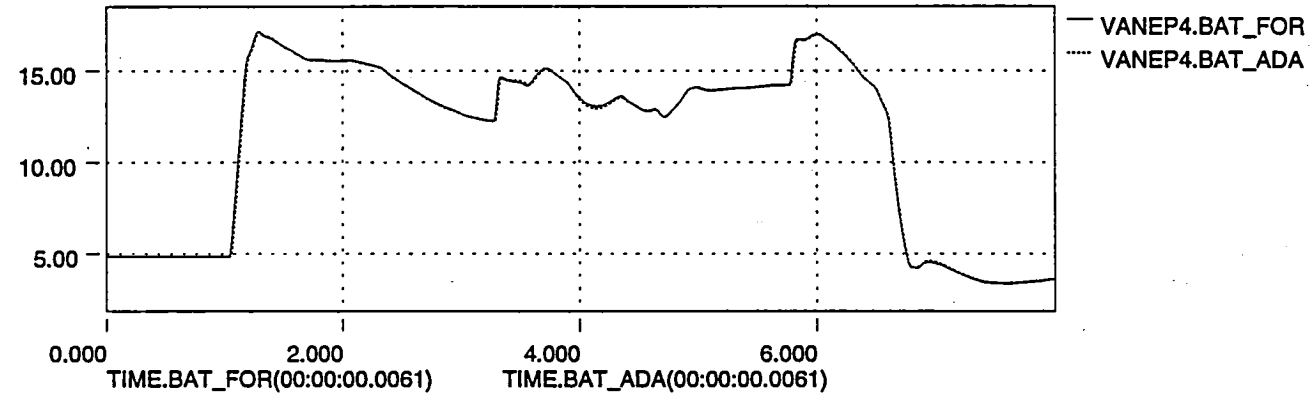

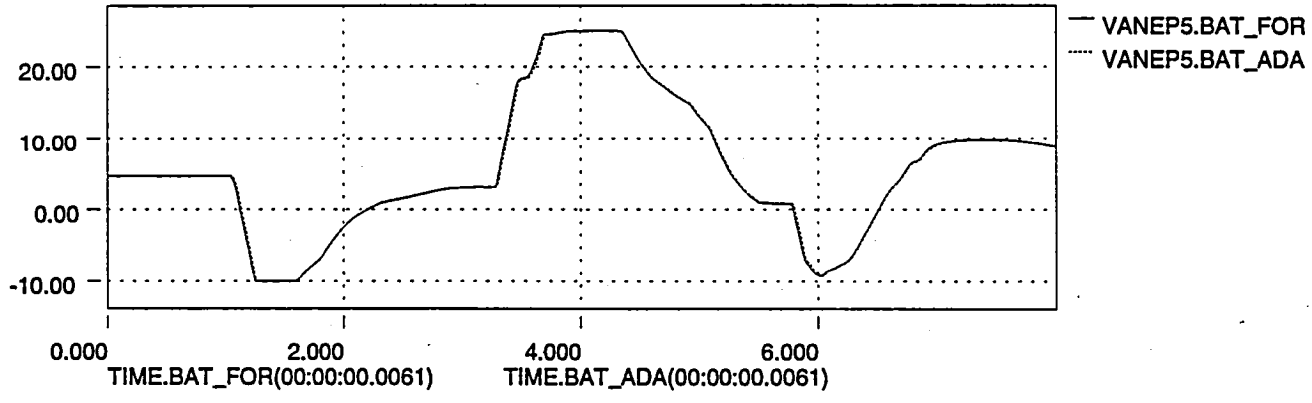

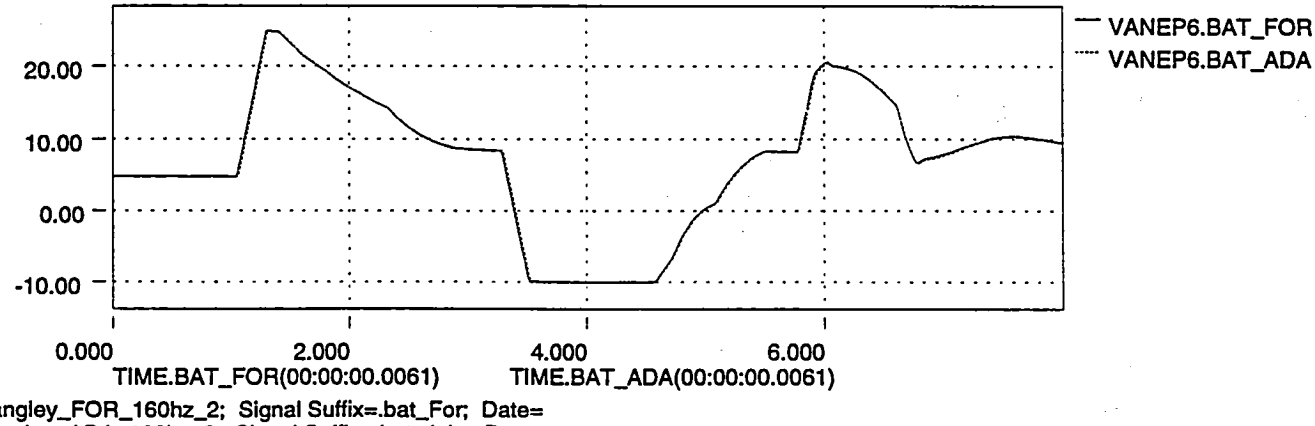

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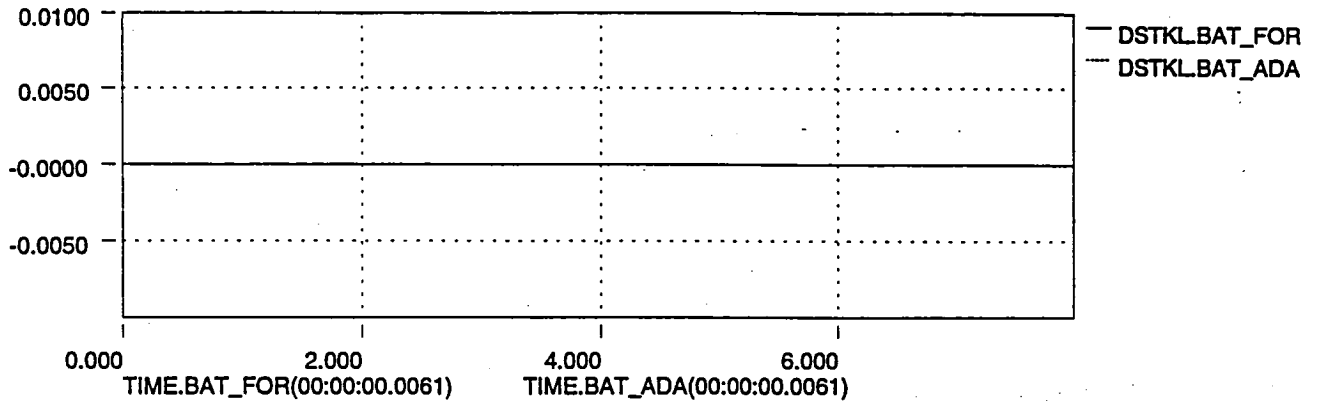

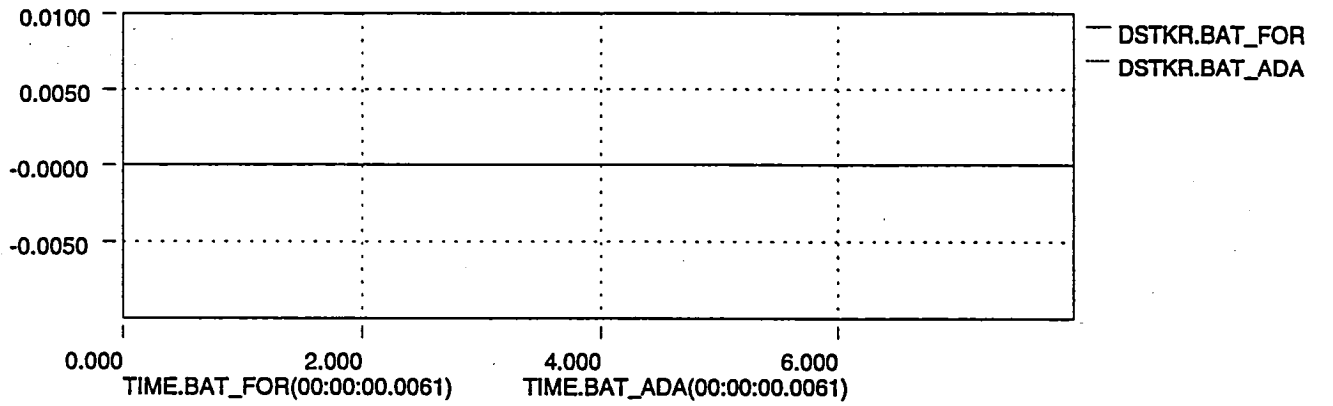

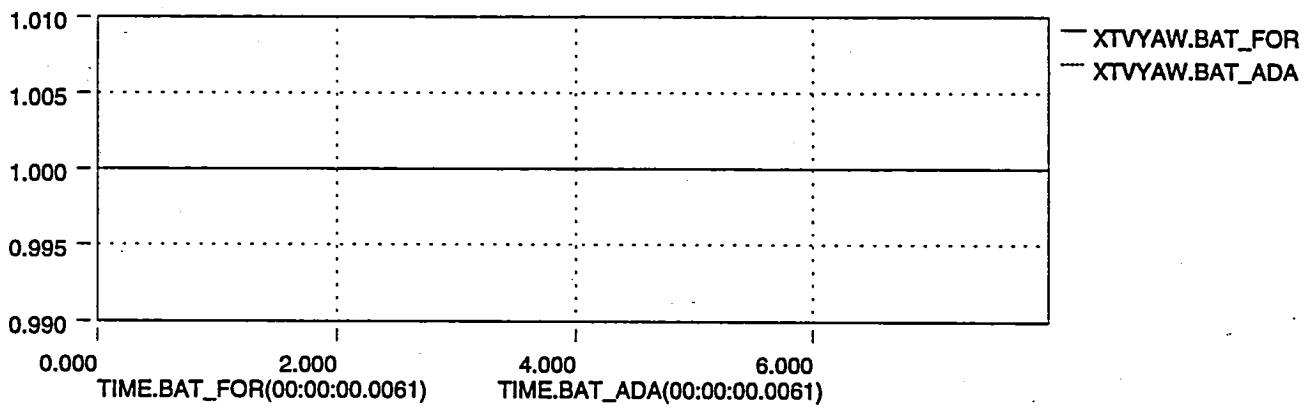

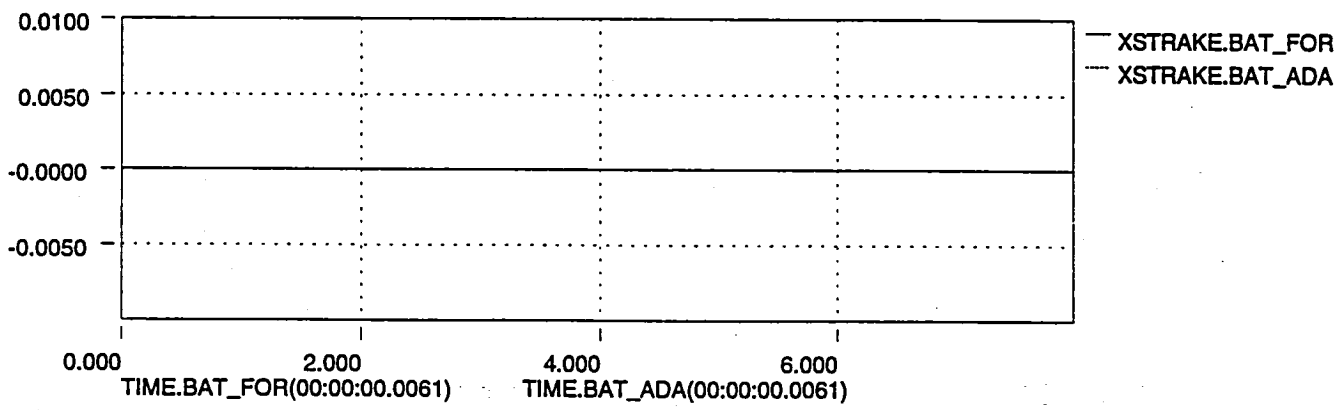

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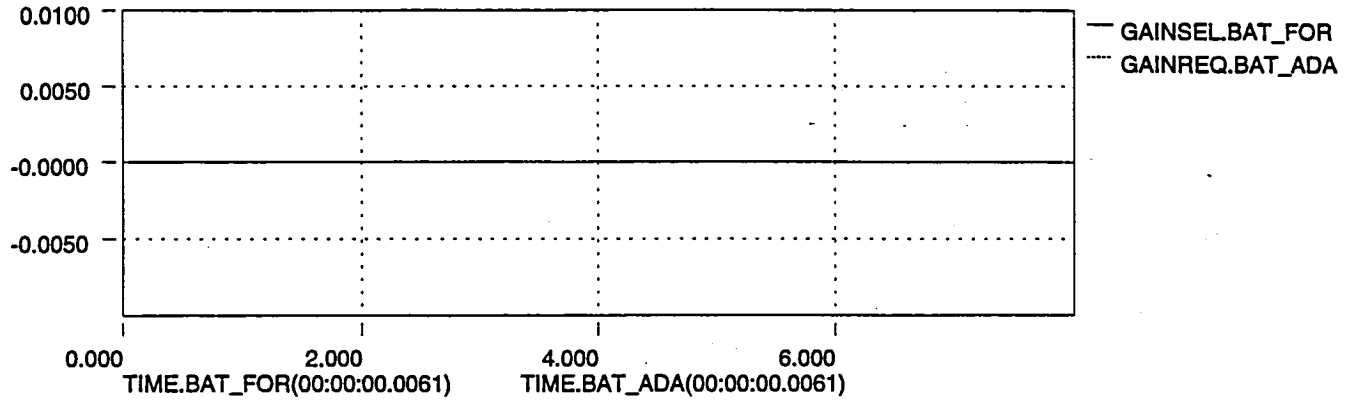

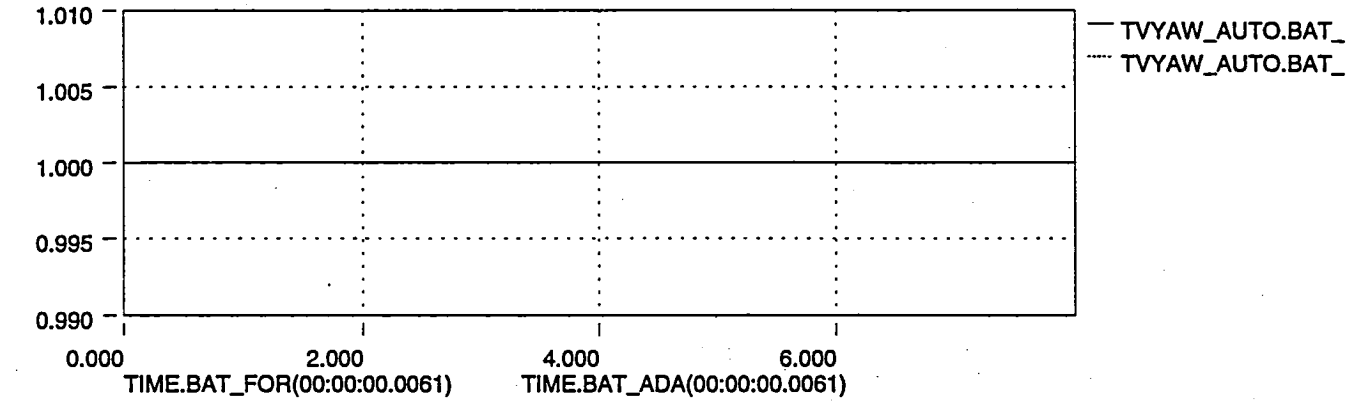

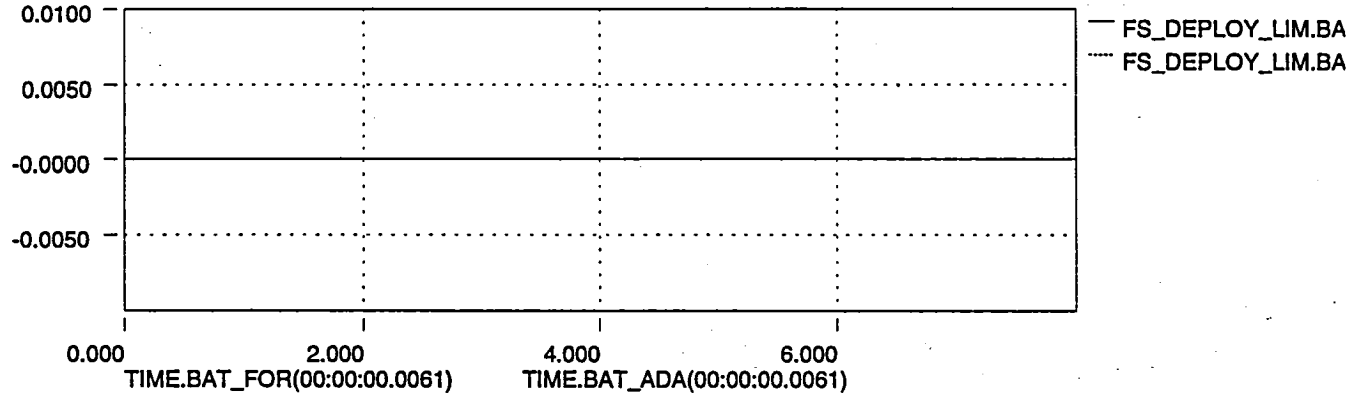

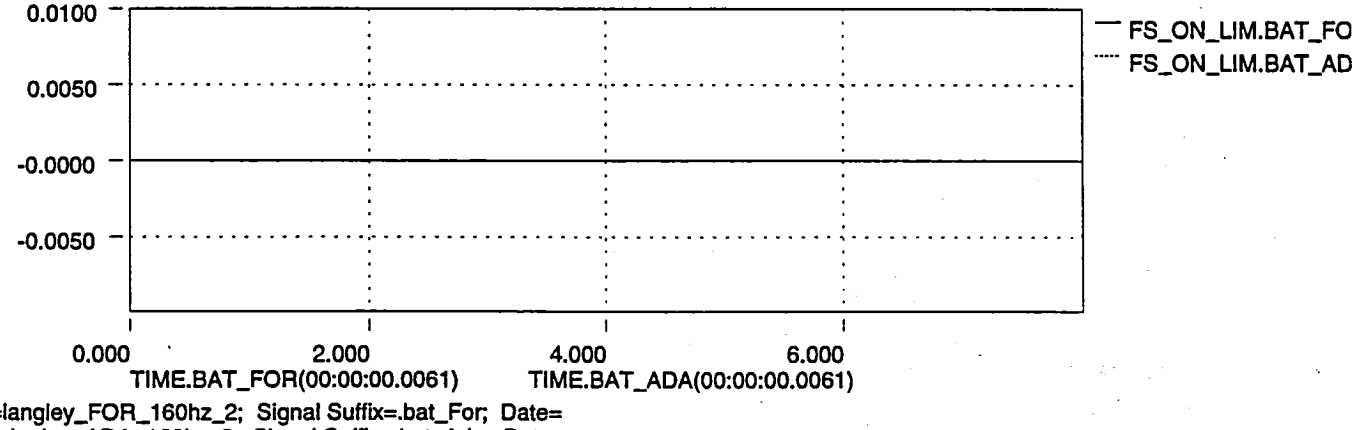

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HIL Issues

1 - Lateral Sensitivity

During the ANSER performance validation checkout a lateral sensitivity was uncovered in the angle-of-attack (AOA) region between 30-40 degrees. This sensitivity was discovered during close examination of checkcase 23, which corresponds to a 2 inch lateral stick doublet at 30 degrees AOA/25000 feet in S mode, a slight overshoot in the left strake deflection was noted. The overshoot was apparent in the HIL and Iron Bird (IB) time histories only. (See left strake deflection, DSTKL, in Figure 1). The batch simulation was modified in an attempt to duplicate the HIL results. Initially, corrections for 2 known HIL effects were made, impact pressure differences between HIL and batch, and the signal selection logic. Both of these known differences are covered in more detail under the discussions of HIL issue 10 and batch simulation issue 1. The batch simulation was modified by adding 14.0 psf to the impact pressure below 30 degrees AOA, and re-run with the lateral stick signal selection model. These changes alone did not reproduce the desired effect of matching the overshoot noted in the HIL time history. Another HIL discrepancy was identified by looking at timing between control law inputs and aircraft state variables. This study resulted in a conclusion that a delay on lateral acceleration into the ANSER control laws existed on the HIL. A time delay of 100 ms was tested and produced similar results between batch and HIL results. (See DSTKL on Figure 2).

This analysis led into additional testing being made between 30 and 50 degrees AOA which was not a part of the ANSER performance validation test plan. Results at 35 and 40 degrees AOA showed a small lateral sensitivity existed in the batch simulation without time delay on Ny. The sensitivity was always found to occur when one strake was deflected between 20-30 degrees and the other was closed at 0 degrees. (See Figure 3 for a batch time history example at 40 degrees AOA). When 100 ms of time delay was added to the control law input Ny, the magnitude of the sensitivity significantly increased. (See Figure 4). One reason this sensitivity existed and was not noticed earlier before this testing was due to the size of the lateral input, and the effect of the signal selection logic which is noted to decrease the initial input and thereby reduce the tendency for the control surfaces to saturate.

Further analysis and testing led to 4 ANSER lateral/directional control law gain changes at 35 and 40 degrees AOA. These gain changes are documented in CCR 829. Figure 5 shows the performance validation results for DSTKL and DSTKR from checkcase 23 after implementation of CCR 829. (Additional time histories for this checkcase are documented in the HIL versus batch simulation comparisons).

Additional analysis was made in the 30 - 40 degree AOA region with regards to the nose strake aero model. The nose strake aero model used in simulation was developed from results obtained in the 30x60 foot Wind Tunnel at LaRC. Static wind tunnel results were available from the Ames 80x120 tunnel, but never implemented into the strake aero model currently being used. Therefore as a test of the control system robustness to strake aero model differences, the 80x120 wind tunnel results were folded in place of the 30x60 results at 30, 35, and 40 degrees AOA where data existed for both models. The modified strake aero model was then tested in batch and on the LaRC DMS piloted simulator and showed significant differences existed in this region, but nothing was found that could be considered safety of flight. See Enclosures 1 and 2 for details of the results.

Figure 1 - HIL Issue 1

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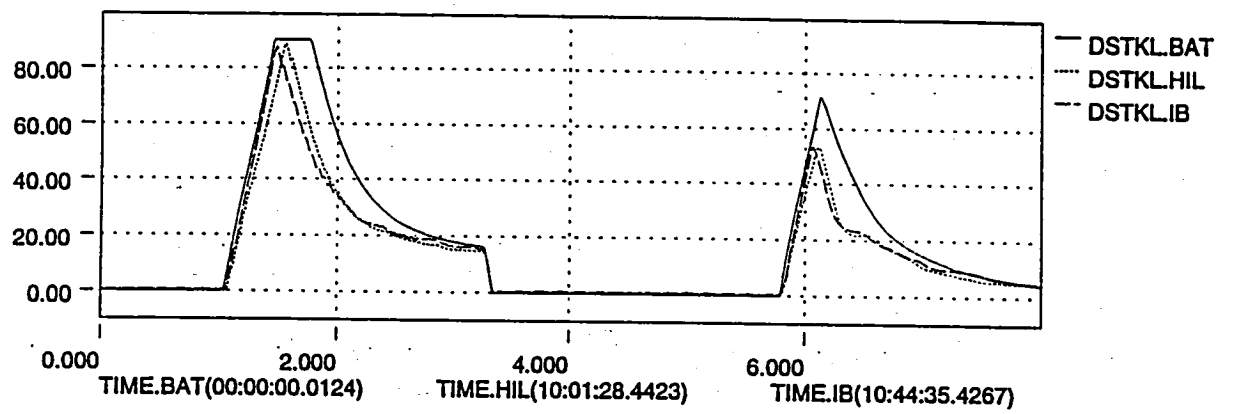

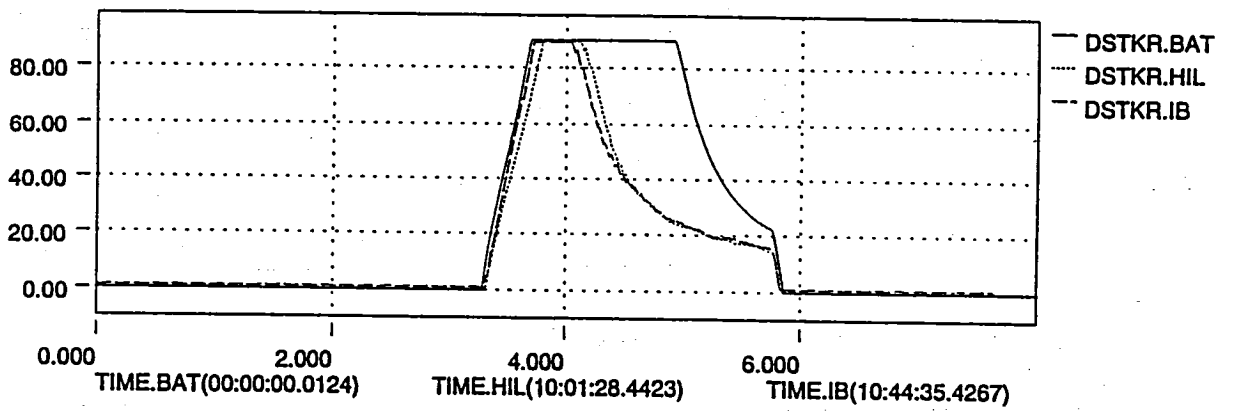

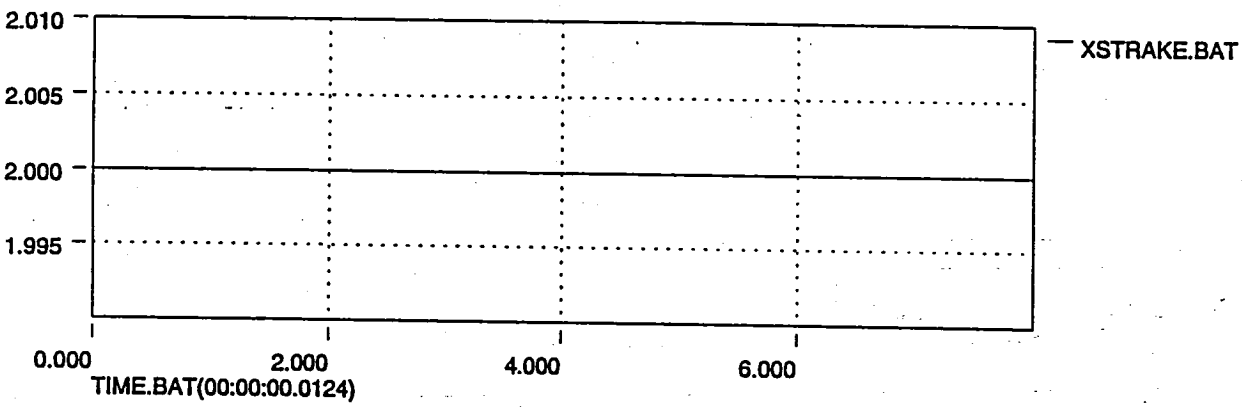

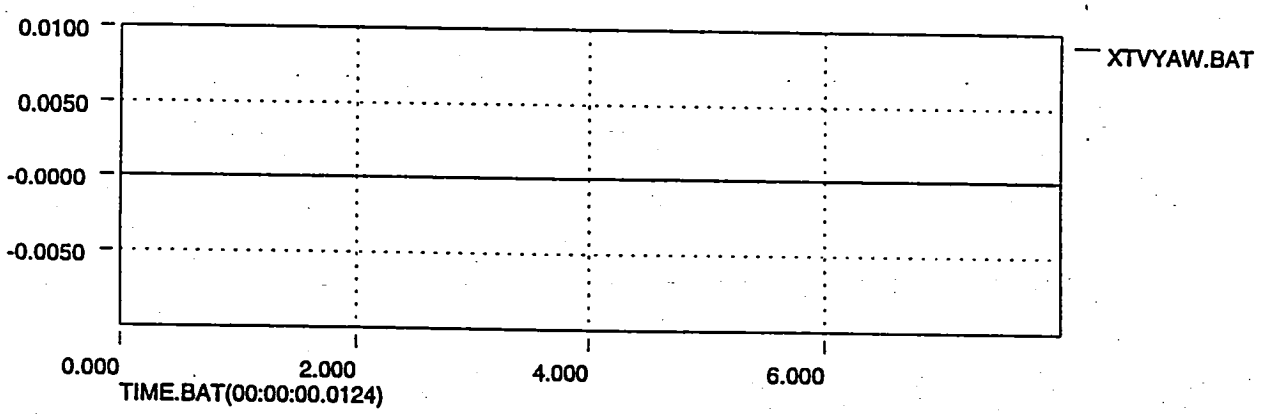

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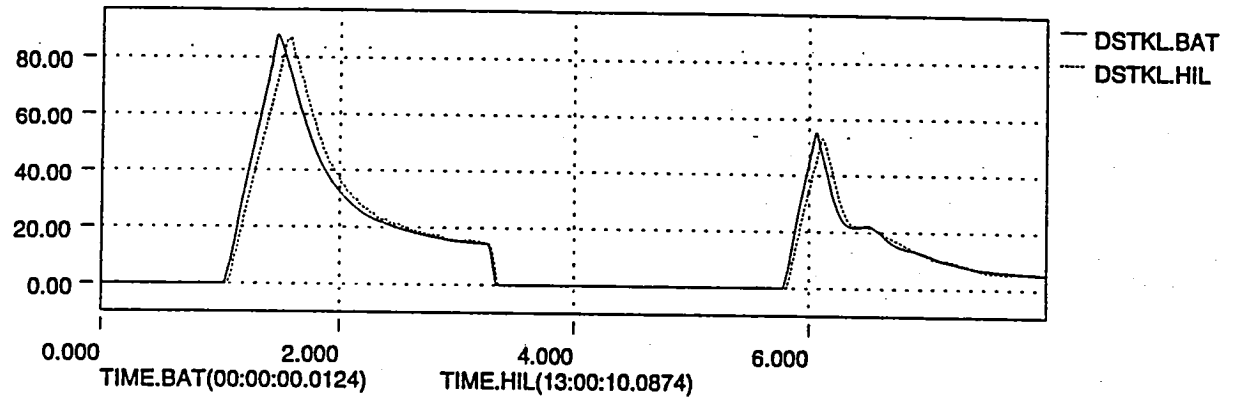
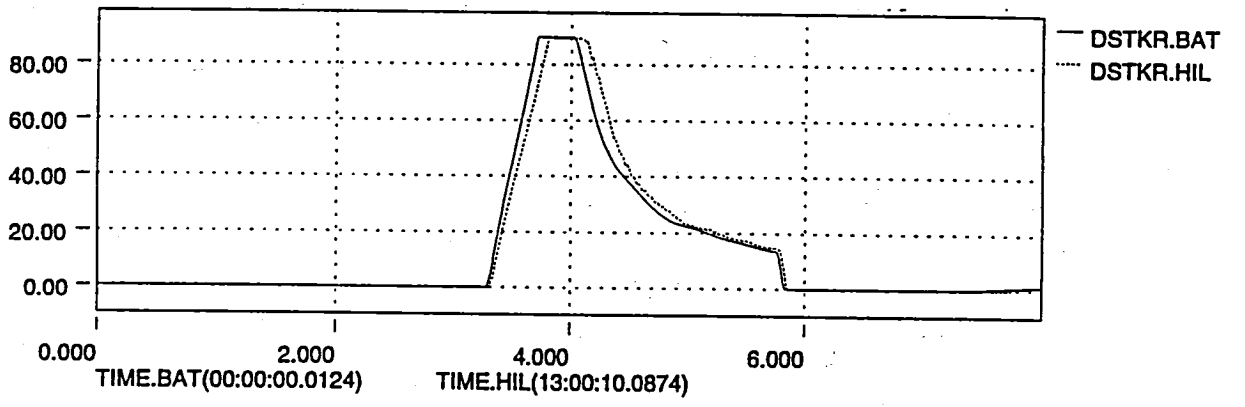
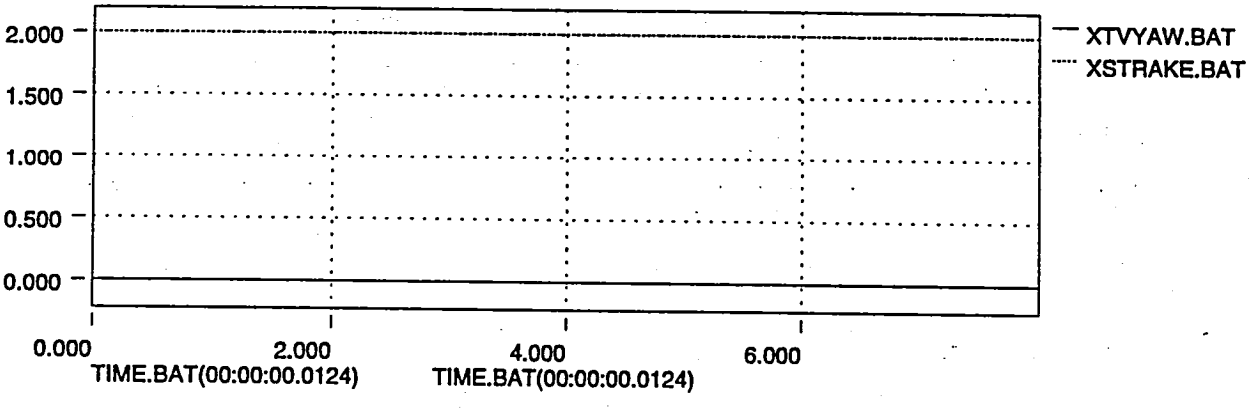
Figure 2 - HIL Issue 1







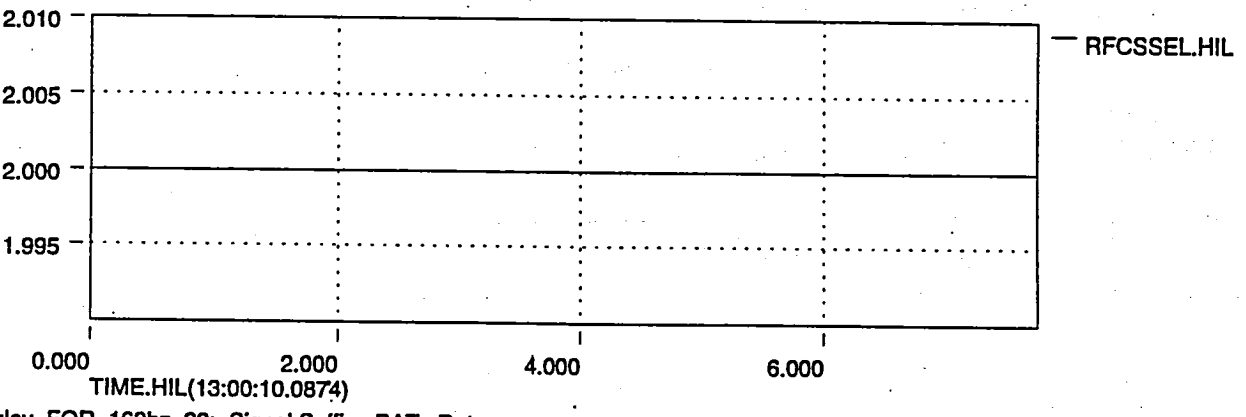


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Figure 3 - HIL Issue 1

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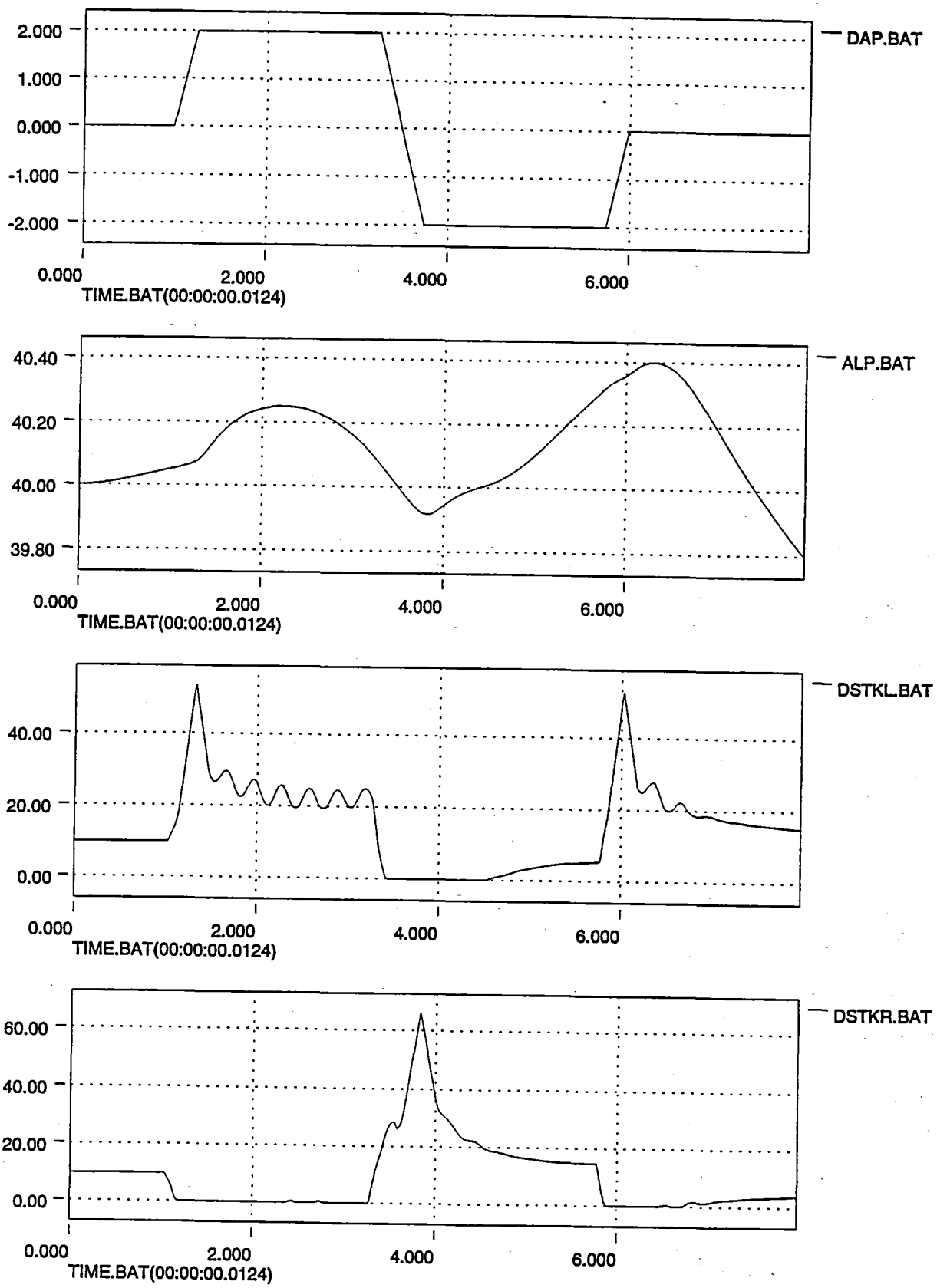

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Figure 4 - HIL Issue 1

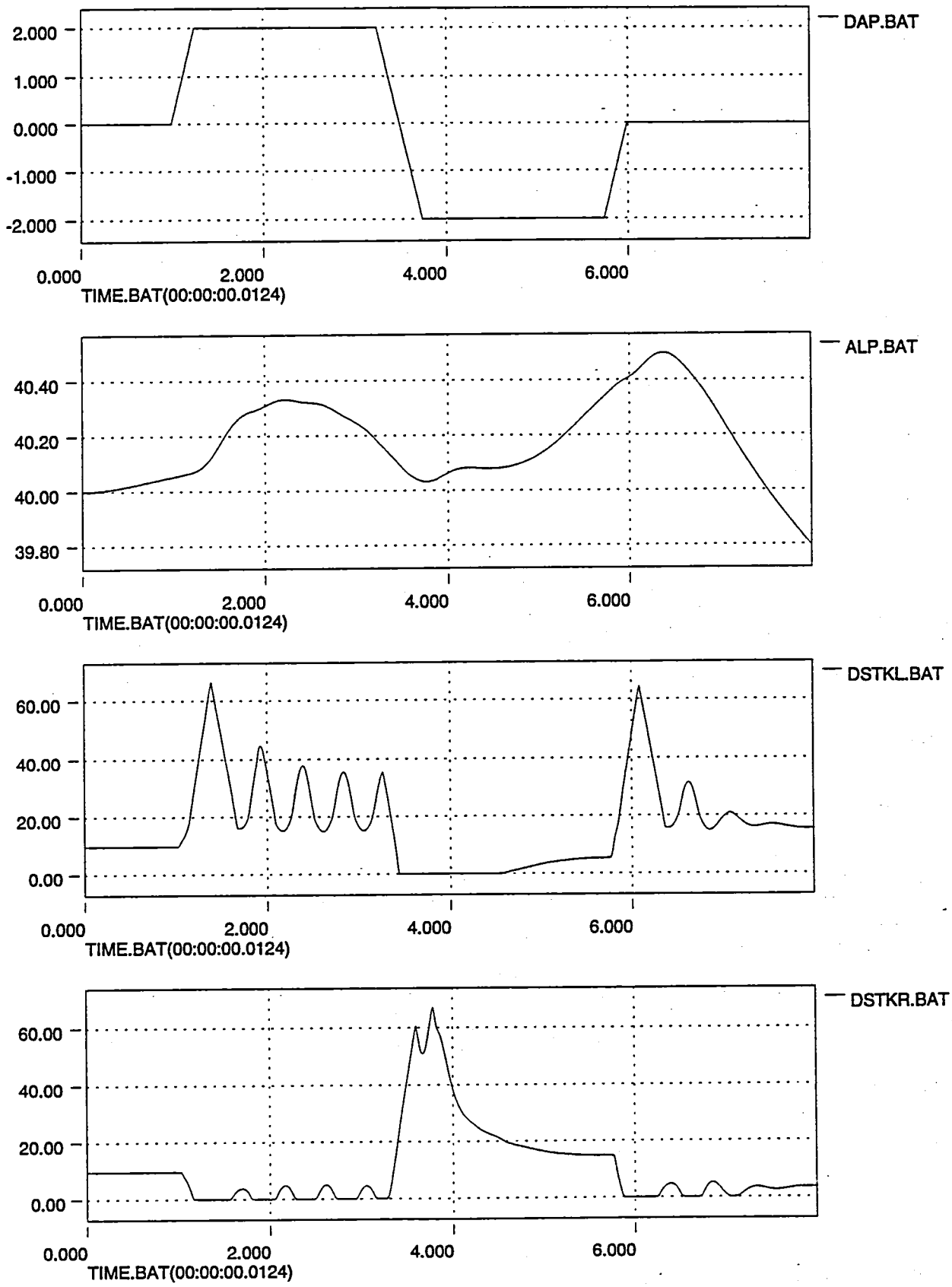

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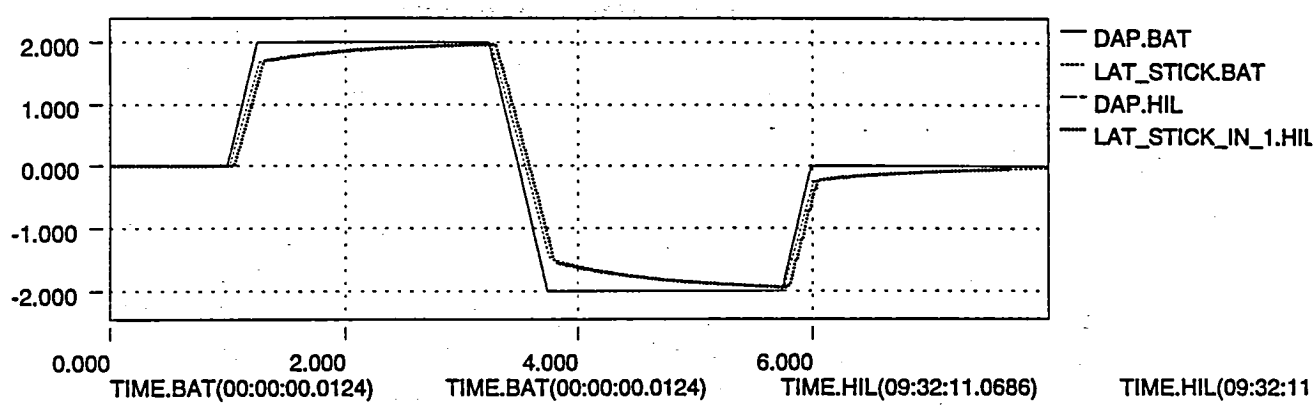
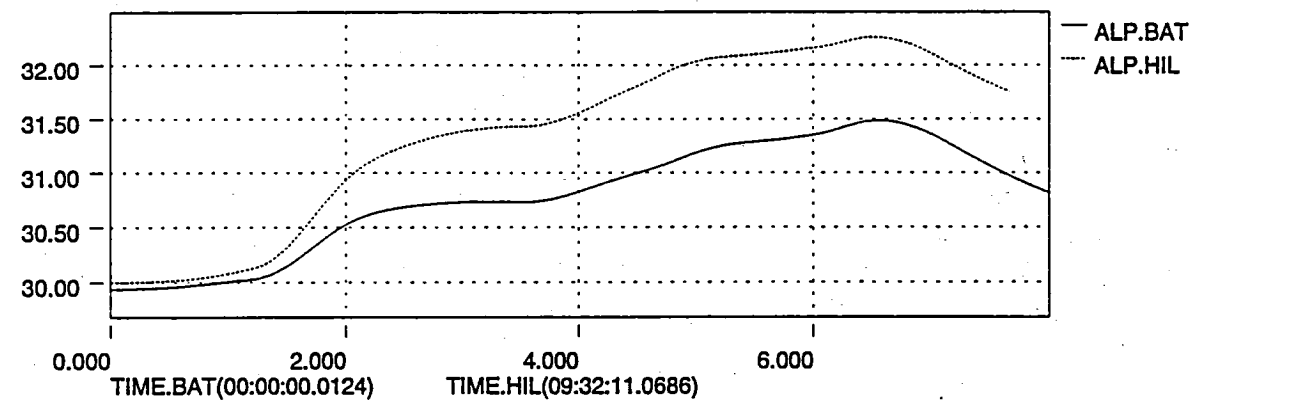
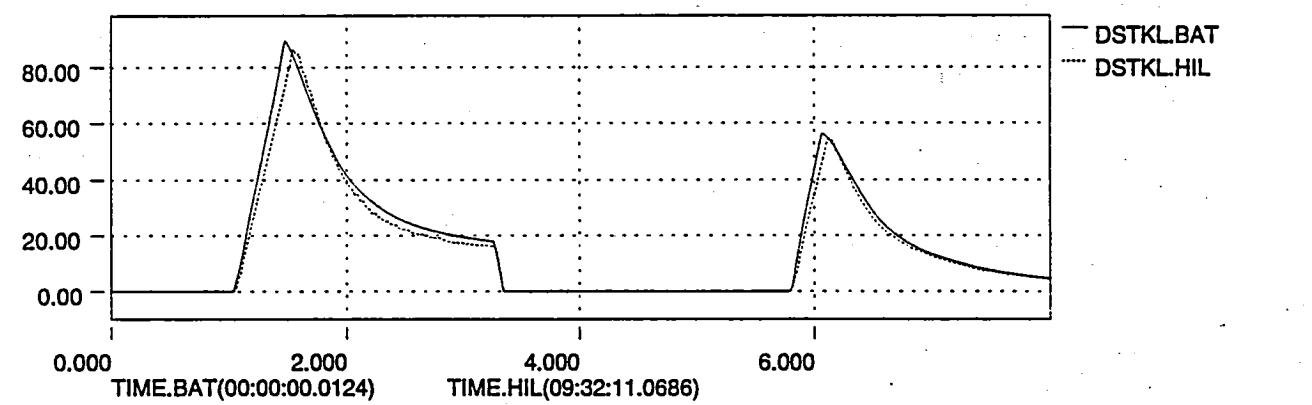
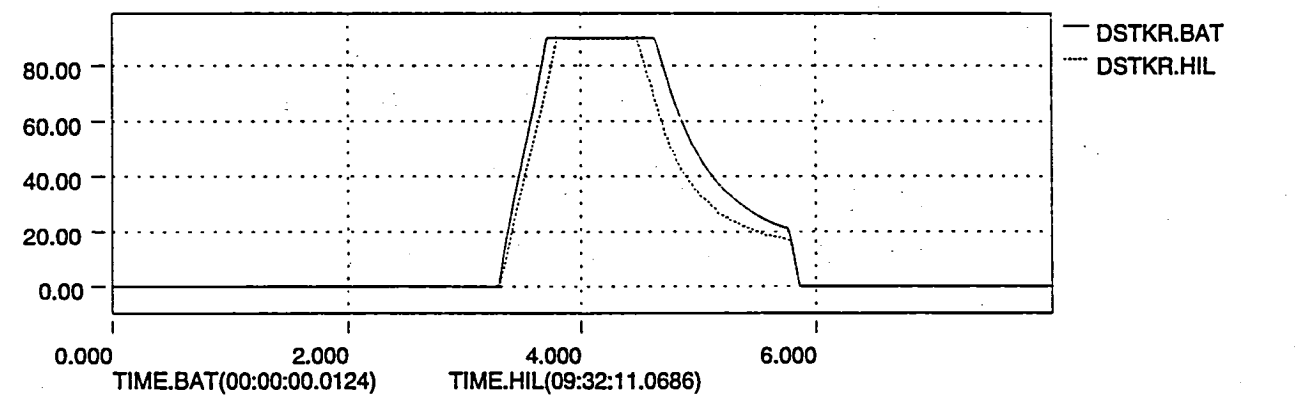
Figure 5 - HIL Issue 1
CASE_23_S_Mode__30alp-35k_Max_AB_2_in_ramp_dap page 1/12









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MEMORANDUM 5/5/95

Ames Full-Scale F/A-18 80 by 120 Data Study

Model Development

A study was conducted to investigate the simulation results for the nose strake using the Ames Full-Scale F/A-18 80x120 data inplace of the 16% F/A-18 30x60 foot results from LaRC. The current nose strake aero model used in all simulations is based on the 30x60 data. The 30x60 model contains 6 main parts that make up the total force and moment contributions for the nose strakes. These are as follows:

1. *Low Speed Static Symmetric*
2. *Low Speed Static Differential*
3. *High Speed Static Increments/Multiples (Differential Only)*
4. *Dynamic Forced Oscillation Symmetric*
5. *Dynamic Forced Oscillation Differential*
6. *Dynamic Rotary Balance (Differential Only)*

For each set of table lookups used to compute these components, there is an associated set of independent parameters and breakpoints for each individual parameter. For the 30x60 model these are as follows:

1. Low Speed Static Symmetric
Beta
13 bkpts {-30, -20, -15, -10, -5, -2, 0, 2, 5, 10, 15, 20, 30}
Alpha
11 bkpts {10, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70}
Symmetric Strake Deflection
7 bkpts {0, 5, 10, 15, 20, 25, 30}

2. Low Speed Static Differential
Beta
13 bkpts {-30, -20, -15, -10, -5, -2, 0, 2, 5, 10, 15, 20, 30}
Alpha
8 bkpts {10, 20, 30, 40, 50, 55, 60, 70}
Differential Strake Deflection
7 bkpts {-90, -60, -45, -30, -20, -10}

3. High Speed Static Increments/Multiples (Differential Only)
Alpha
10 bkpts {10, 15, 20, 25, 30, 35, 40, 45, 50, 55}
Mach
4 bkpts {0.2, 0.4, 0.6, 0.8}

4. Dynamic Forced Oscillation Symmetric
Alpha
15 bkpts {0, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 80}
Symmetric Strake Deflection
3 bkpts {0, 10, 45}

5. Dynamic Forced Oscillation Differential
Alpha
15 bkpts {0, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 80}
Differential Strake Deflection
2 bkpts {0, 90}

6. Dynamic Rotary Balance (Differential Only)
Non dimensional Rotation Rate
9 bkpts {-0.2, -0.1, -0.05, -0.025, 0., 0.025, 0.05, 0.1, 0.2}
Alpha
16 bkpts {0, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 80, 90}
Beta
3 bkpts {-10, 0, 10}
Differential Strake Deflection
3 bkpts {-90, 0, 90}

The scope of replacing the 30x60 data was limited to replacing only the *Low Speed Static Symmetric and Differential* data at alphas 30, 35, and 40 degrees. This was done to limit the time to complete this task and look at the effect of using the 80x120 data in a region where problems were addressed in the lateral/directional control law design and the largest variation in the lateral/directional gains occured.

Data from the 80x120 is not as complete as the 30x60 tunnel data. The 80x120 data existed at all the same alphas as the 30x60. But the only 80x120 data used for this simulation study was for alphas 30, 35, and 40 degrees. 80x120 data was not available at all alphas and strake deflections needed to develop an aero model that could replace the 30x60 data point for point. Data in bold below highlights 80x120 data that replaced 30x60 data directly.

1. Low Speed Static Symmetric

Beta

13 bkpts {-30, **-20, -15, -10, -5, -2, 0, 2, 5, 10, 15, 20,** 30}

Alpha

11 bkpts {10, 20, 25, **30, 35, 40**, 45, 50, 55, 60, 70}

Symmetric Strake Deflection

7 bkpts {**0**, 5, **10**, 15, 20, 25, 30}

2. Low Speed Static Differential

Beta

13 bkpts {-30, **-20, -15, -10, -5, -2, 0, 2, 5, 10, 15, 20,** 30}

Alpha

8 bkpts {10, 20, **30, 40**, 50, 55, 60, 70}

Differential Strake Deflection

7 bkpts {**-90, -60**, -45, **-30**, -20, **-10**}

Data to fill in the missing break points were computed as follows. The 30° beta points were created by extrapolating the beta sweep data once the available strake increments had been generated. Data for the 5° symmetric strake deflection was created by dividing the 10° symmetric values by 2 (averaging between 0° and 10° symmetric deflections). Larger strake deflections were not needed because they are not used below alpha = 40°. The -45° differential strake increments were generated by averaging the -30° and -60° strake increments because the strake effectiveness is nearly linear in that region. The -20 degree strake deflection occurs in a very non-linear region of strake effectiveness. Strake sweep data containing -20° differential strake deflection was available at zero beta from the 80x120 data. We used that to generate a multiplier for the -30° strake deflection to generate the -20° strake deflection data at all betas as shown below:

$$[\text{diff. strake} = -20\,(\text{beta})] = \left[\frac{\text{diff. strake} = -20\,(\text{beta} = 0)}{\text{diff. strake} = -30(\text{beta} = 0)}\right][\text{diff. strake} = -30\,(\text{beta})]$$

This of course makes the assumption that the strake sweep does not change shape with beta.

Simulation Results

The following table of runs was made to evaluate the ANSER control law performance differences between the 30x60 and 80x120 model.

Lateral Stick Inputs

1 inch doublet Alpha = 30, 35, and 40 degrees Right/Left
Figures 1 - 3
2 inch doublet Alpha = 30, 35, and 40 degrees Right/Left
Figure 4 - 6
3 inch doublet Alpha = 30, 35, and 40 degrees Right/Left
Figures 7 - 9

Pedal Inputs

50 lb doublet Alpha = 40 degree Right/Left, Left/Right
Figure 10 and 11
100 lb doublet Alpha = 40 degree Right/Left
Figure 12

Longitudinal Stick Input

2 inch doublet Alpha = 40 degree Aft/Fwd
Figure 13

All time history runs made were done in S mode only at an altitude of 25000 feet. Differences between the time histories show significant differences exist, but nothing resulted from batch simulation that would be considered safety of flight. Further analysis with different control law modes and inputs are planned for piloted simulation on the DMS to further support this conclusion.

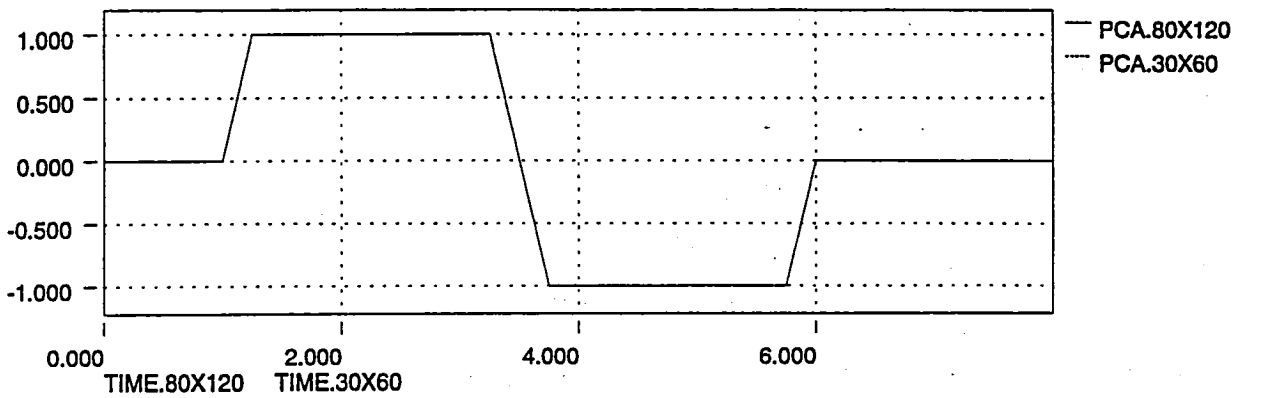
Mike Messina
x42350

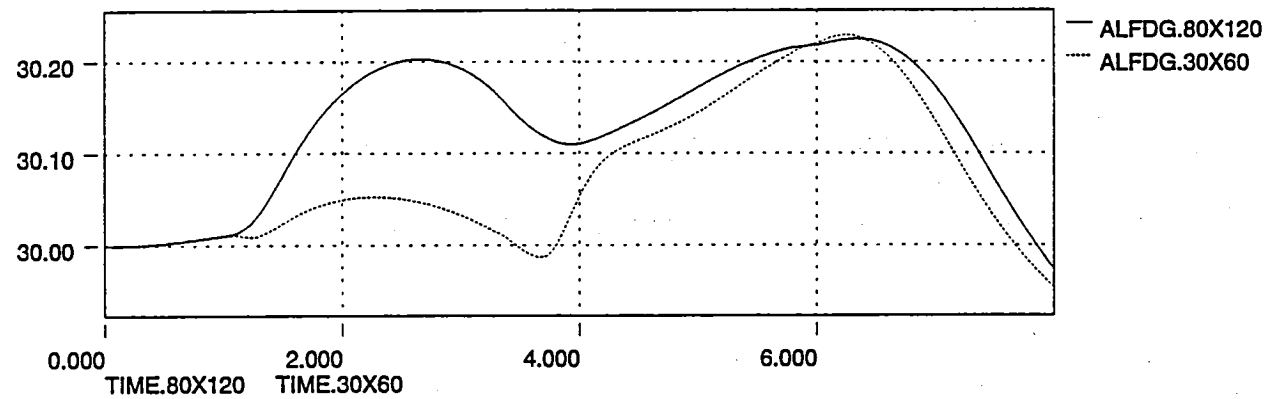
Keith Hoffler
x41144

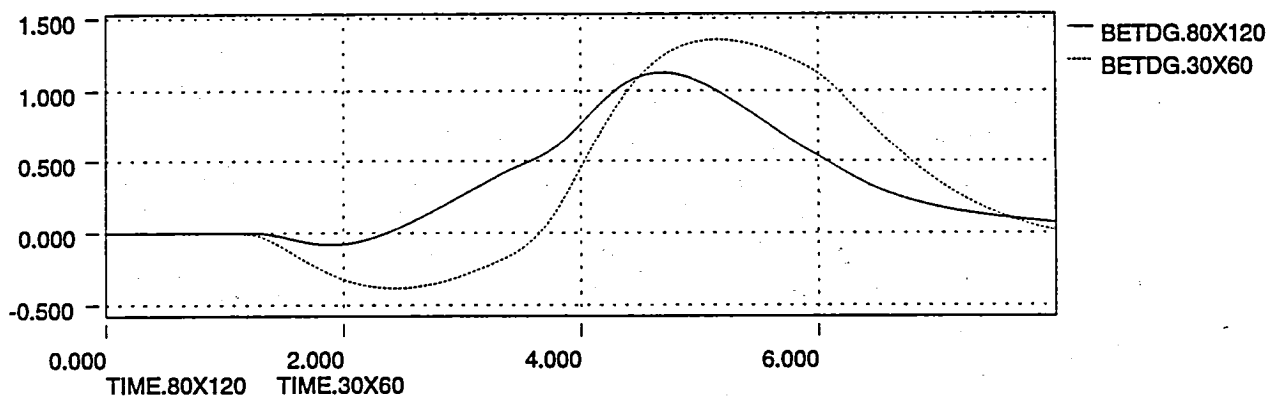
Enclosure 1

Fri May 5 08:51:33 1995

Figure 1 - 1 inch Doublet/30 degrees AOA page 1/2







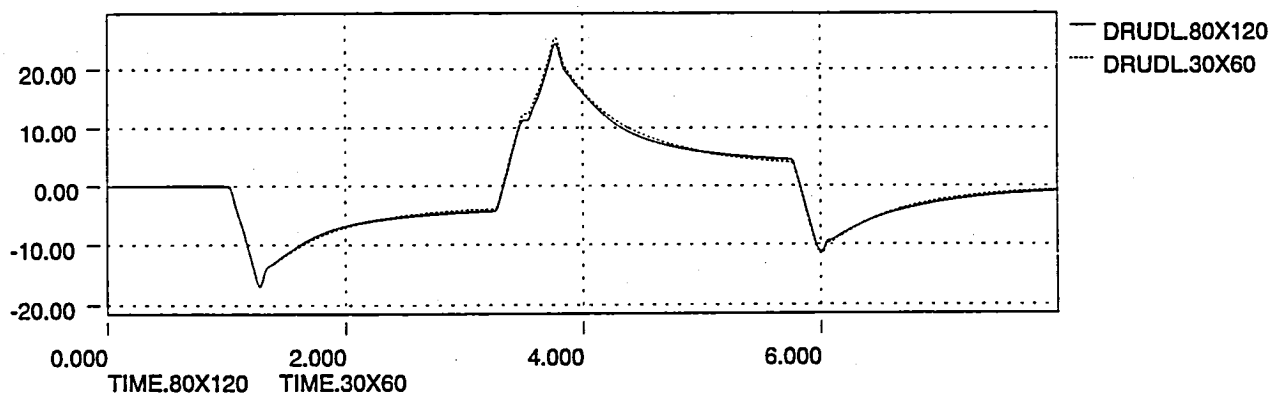


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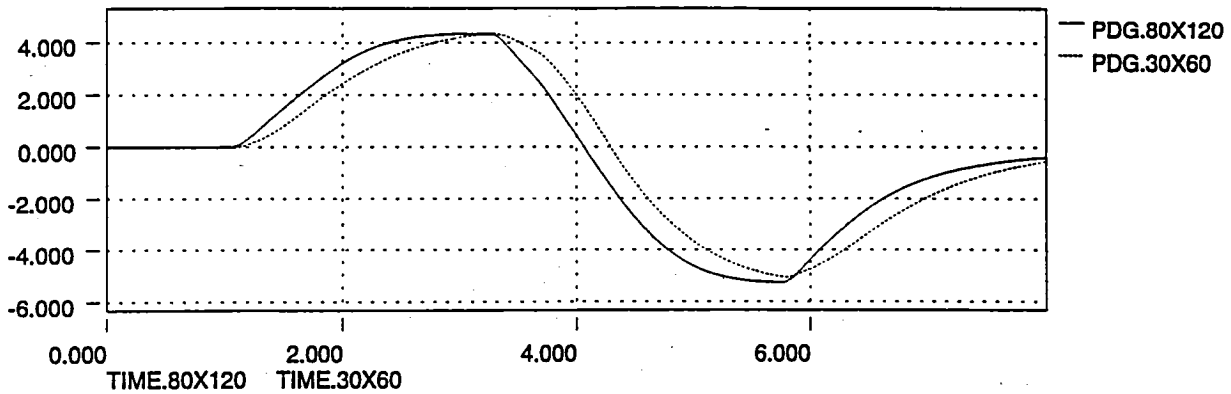
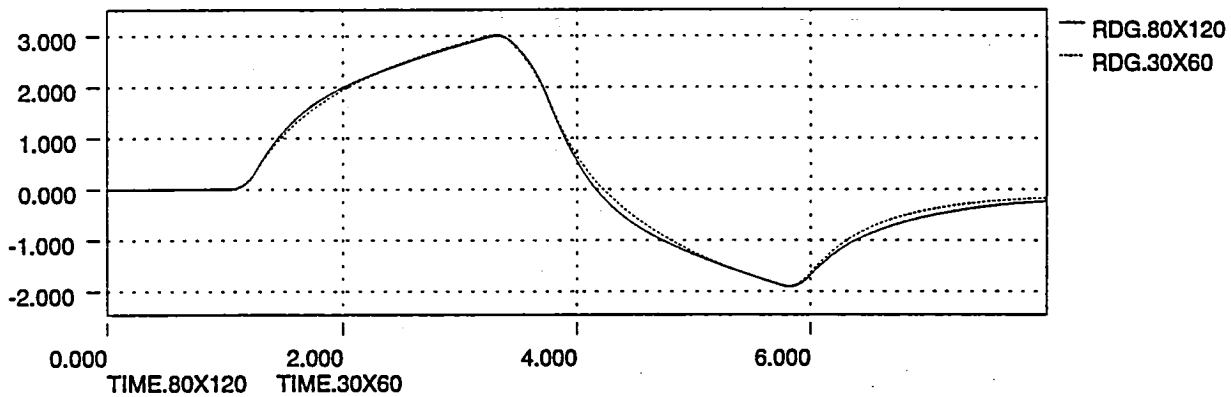
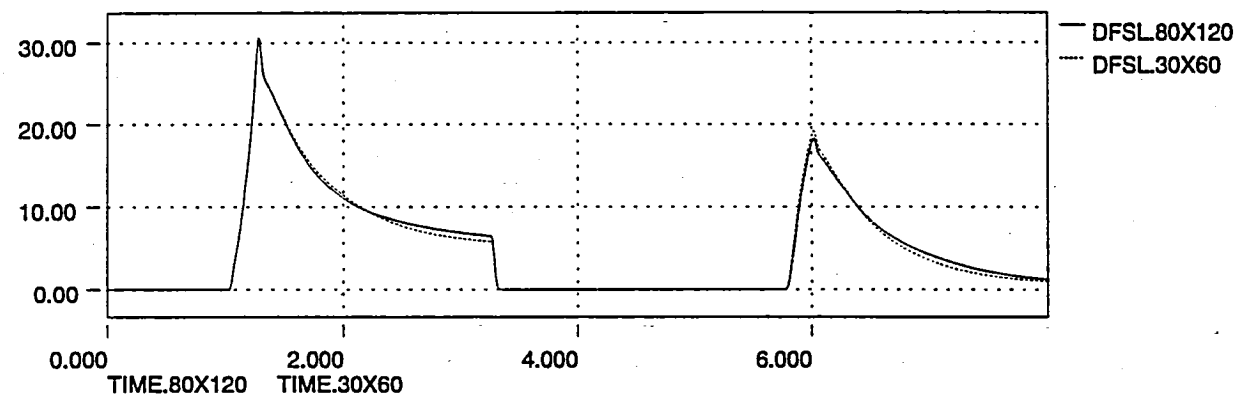
Figure 1 (Cont'd) - 1 inch Doublet/30 degrees AOA page 2/2







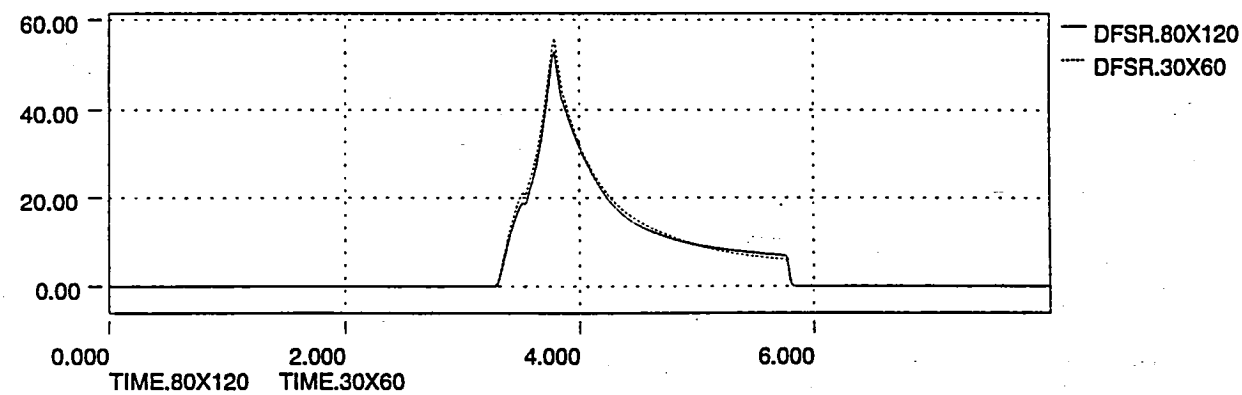


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Figure 2 - 1 inch Doublet/35 degrees AOA page 1/2

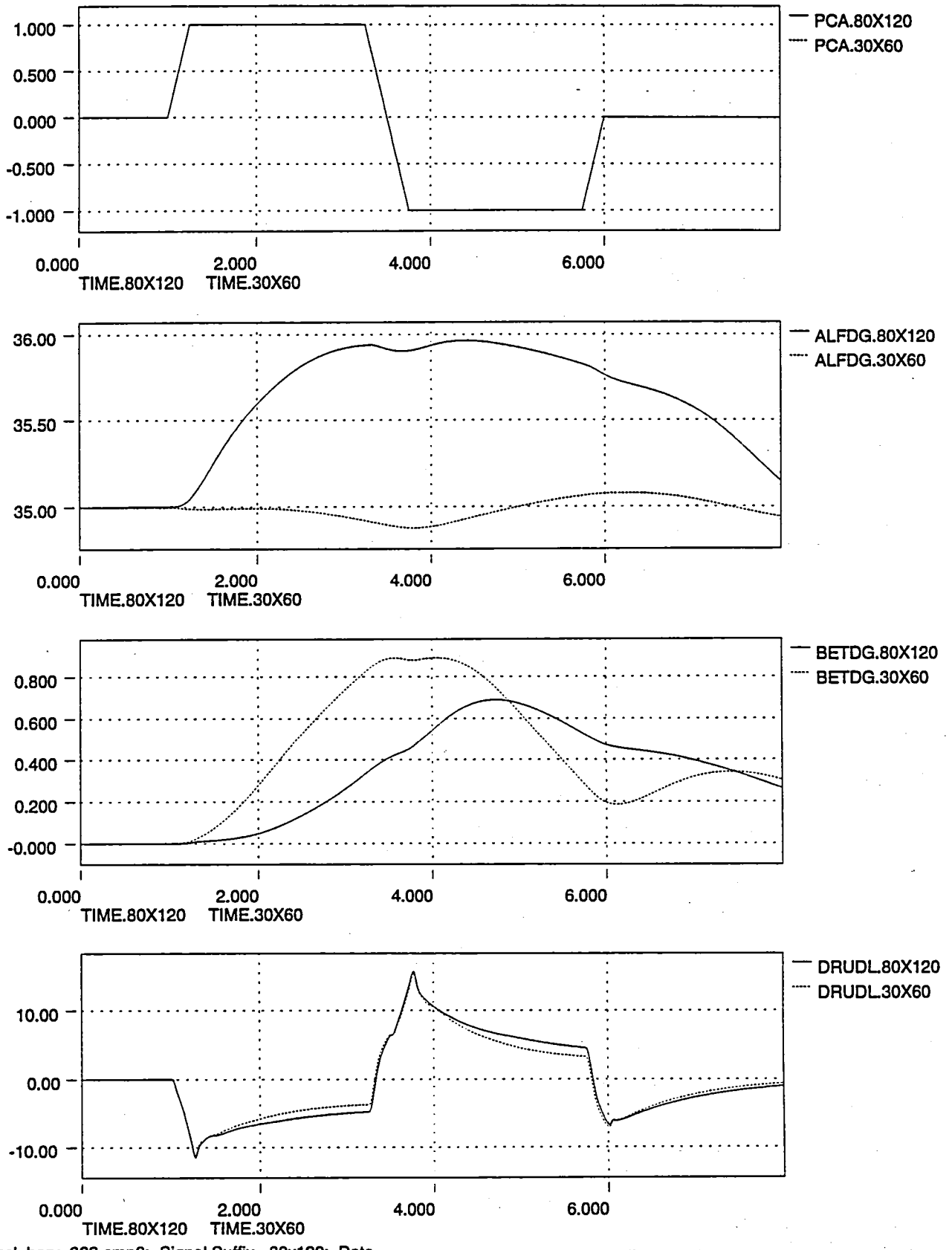

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Figure 2 (Cont'd) - 1 inch Doublet/35 degrees AOA page 2/2

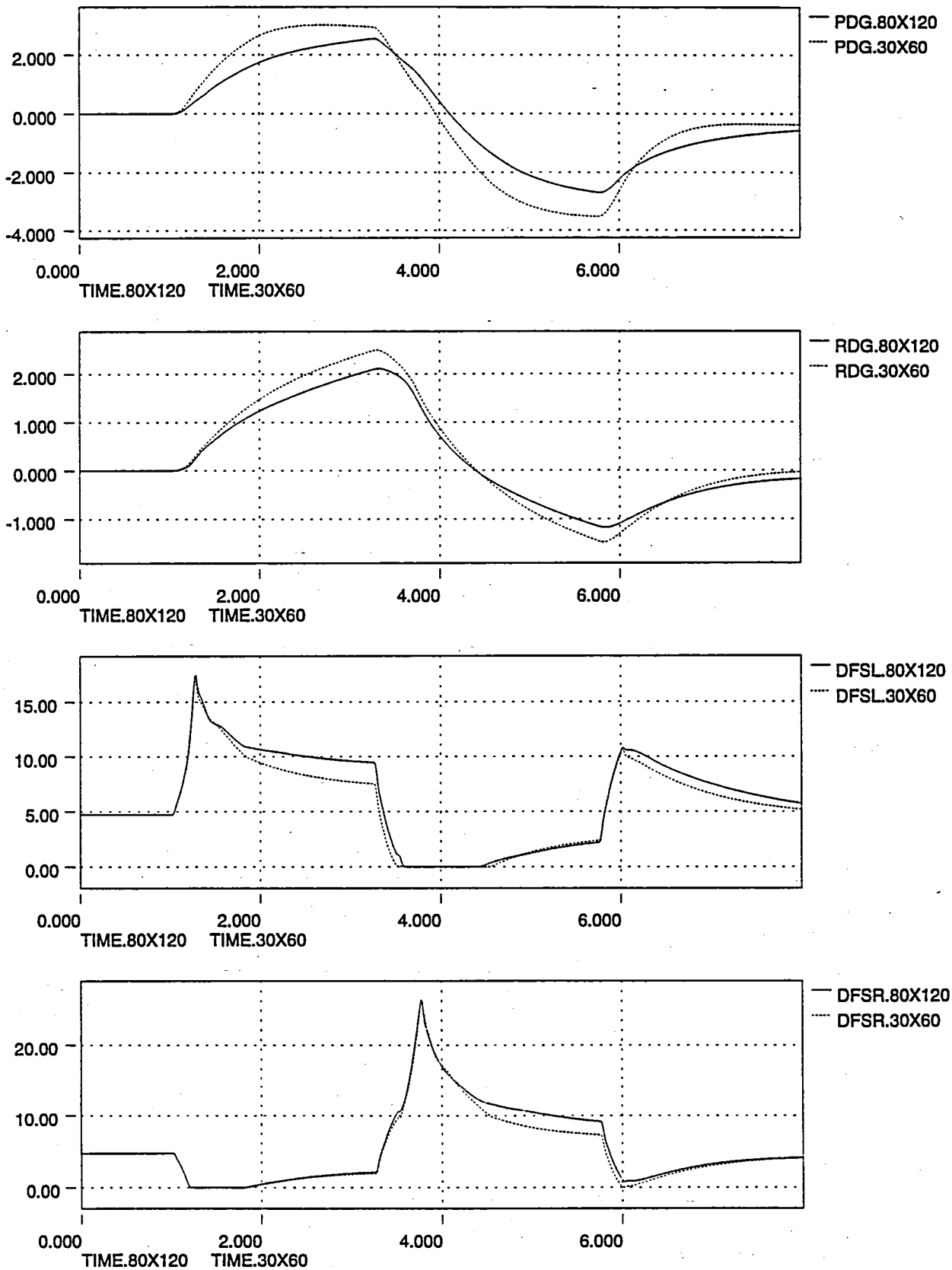

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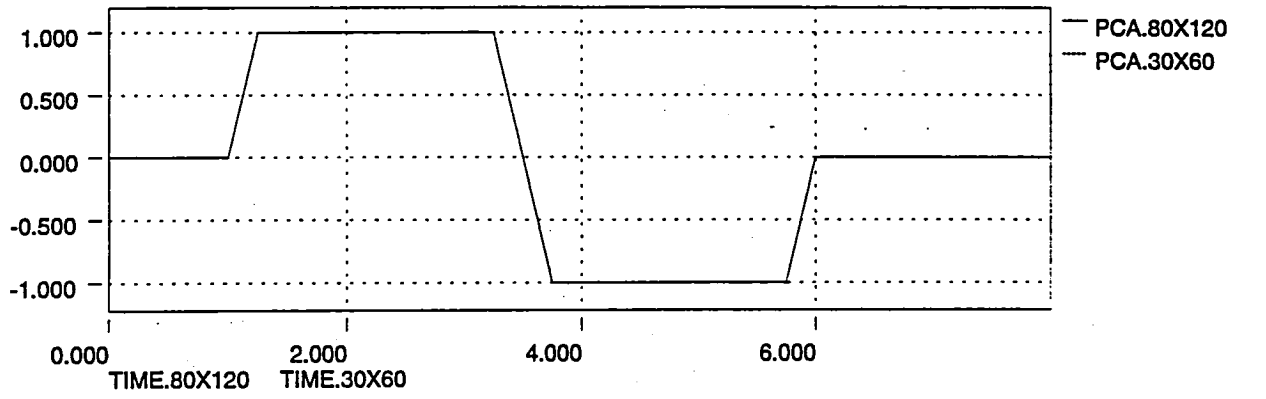
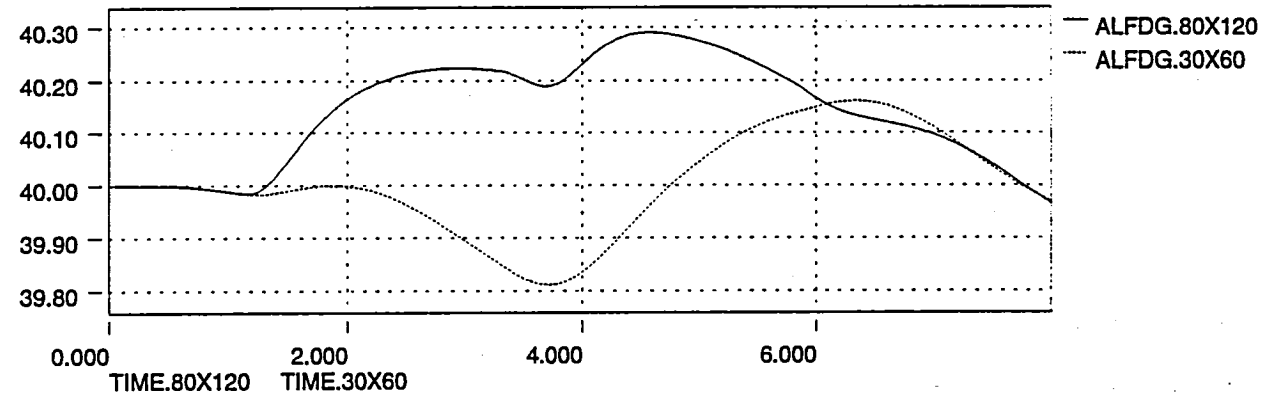
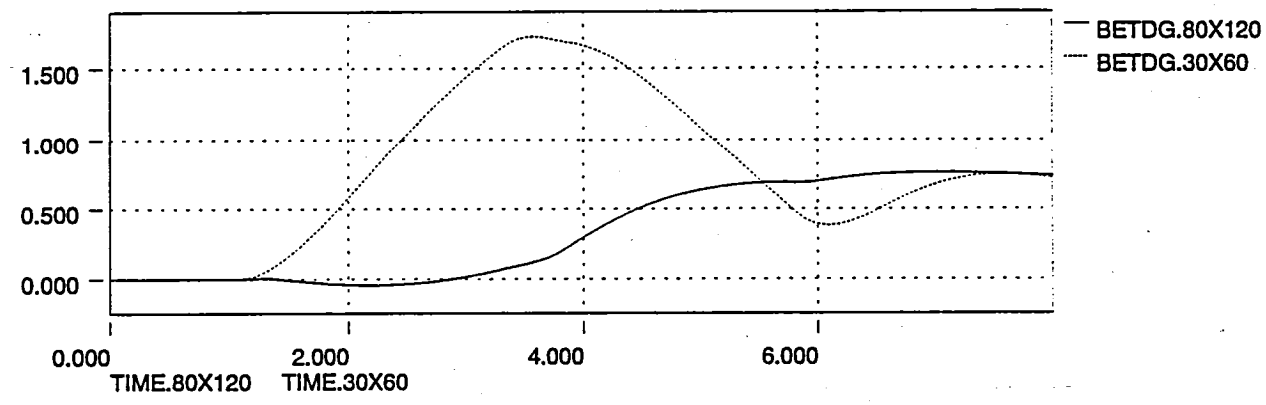
Figure 3 - 1 inch Doublet/40 degrees AOA page 1/2







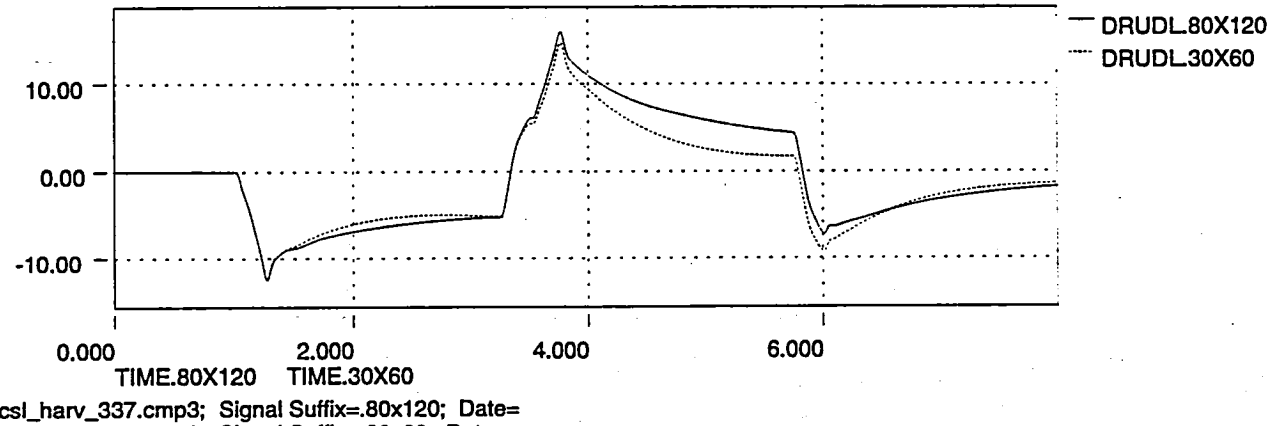


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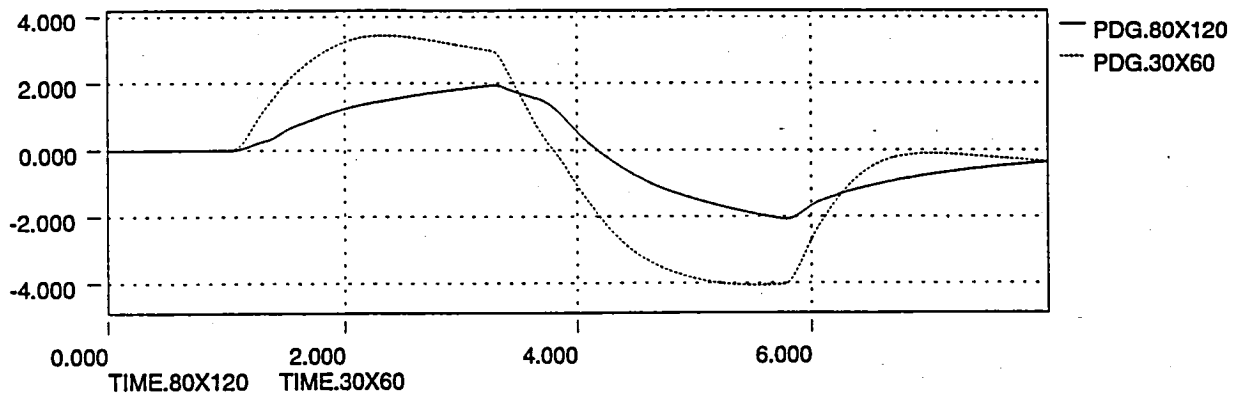
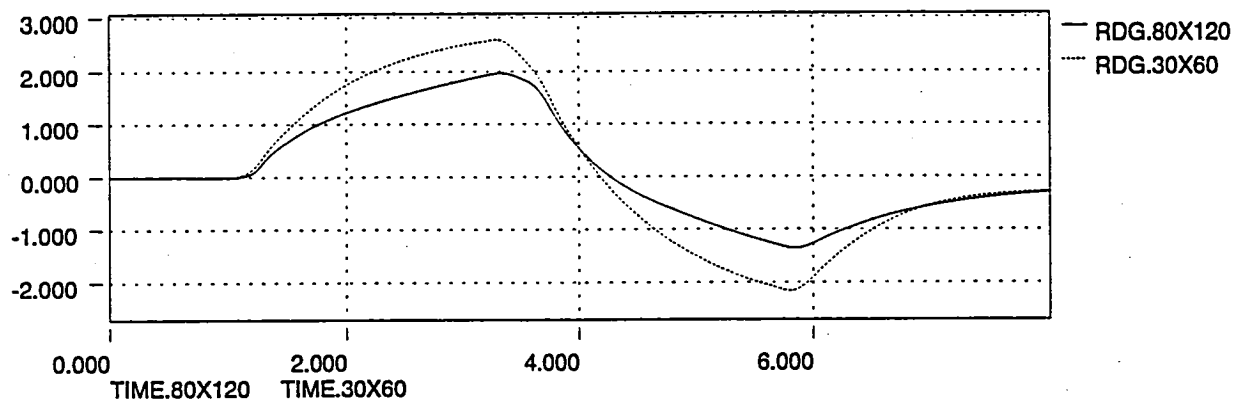
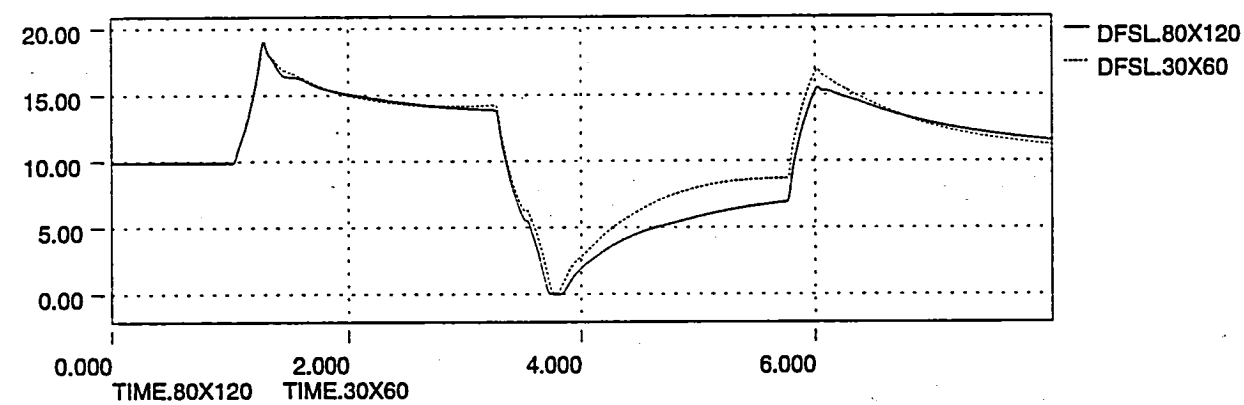
Figure 3 (Cont'd) - 1 inch Doublet/40 degrees AOA page 2/2







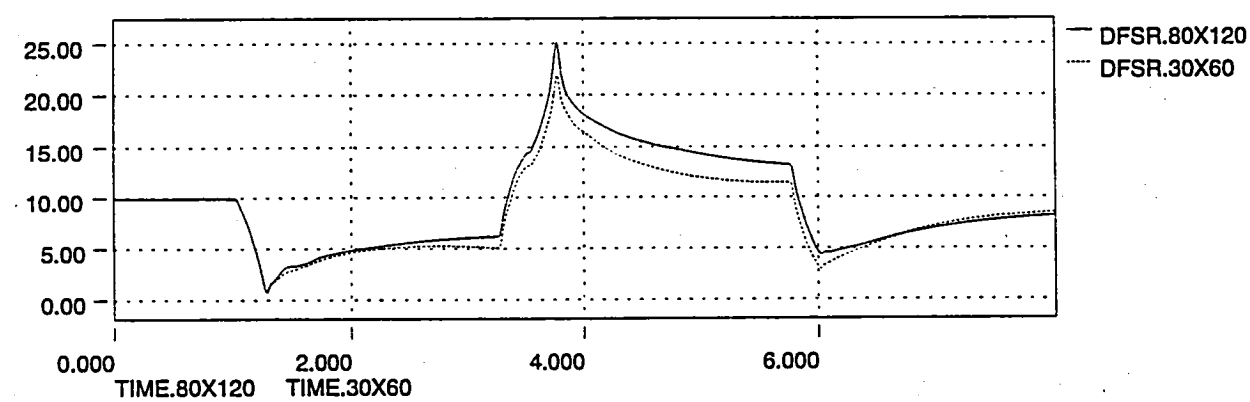


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Figure 4 - 2 inch Doublet/30 degrees AOA/25K page 1/2

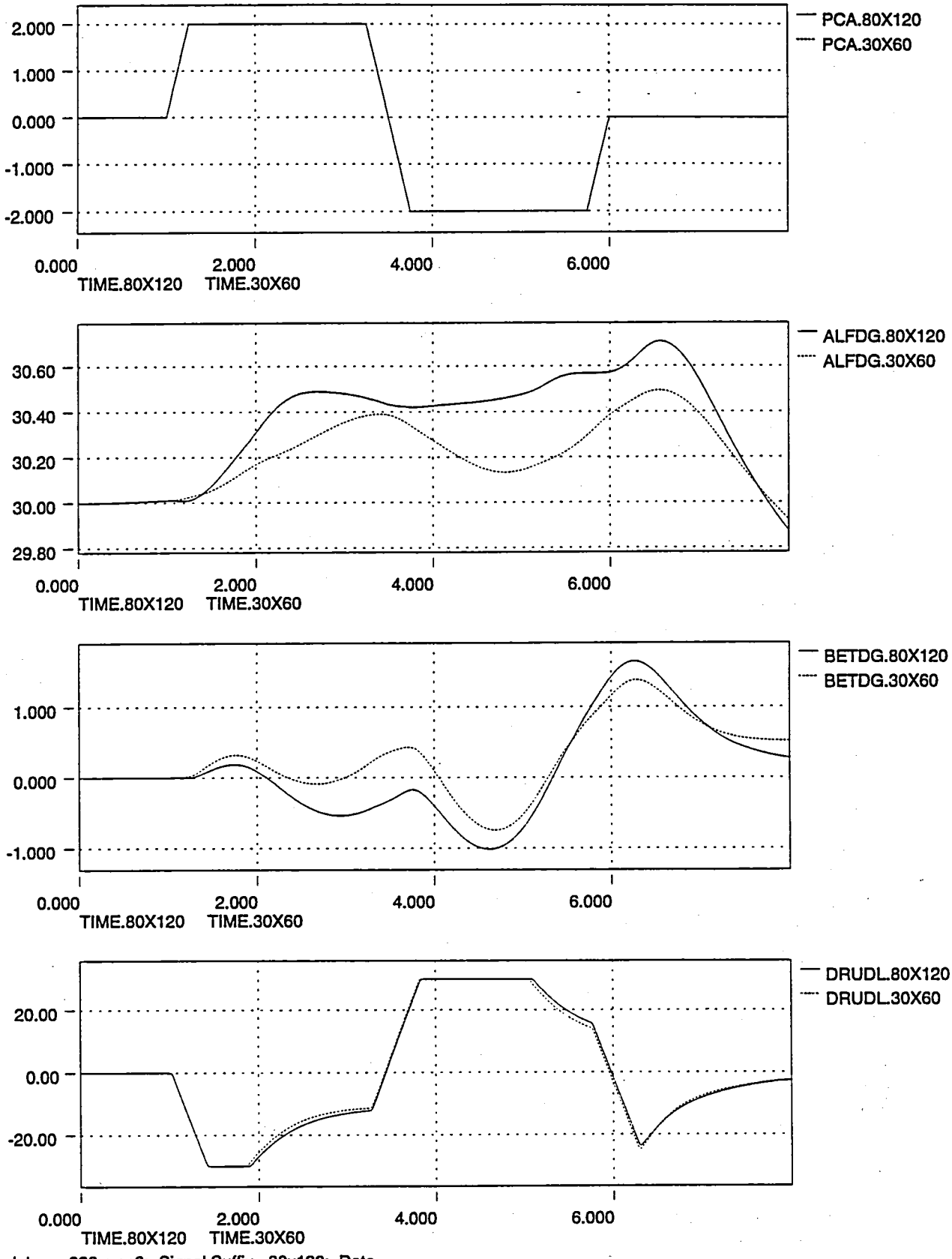

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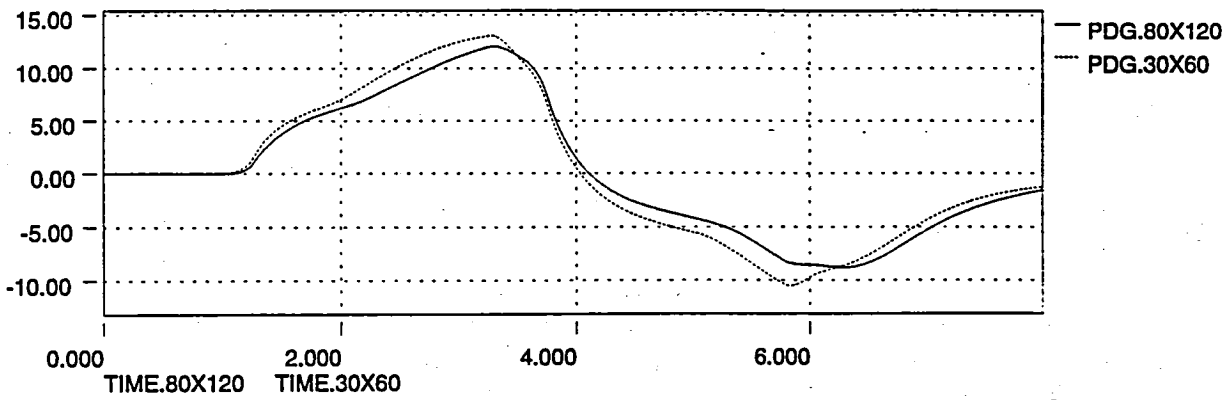
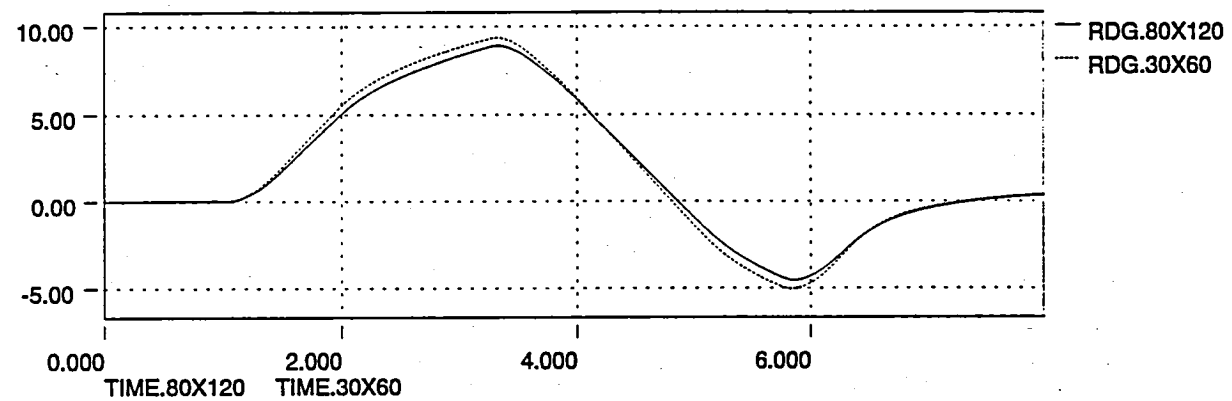
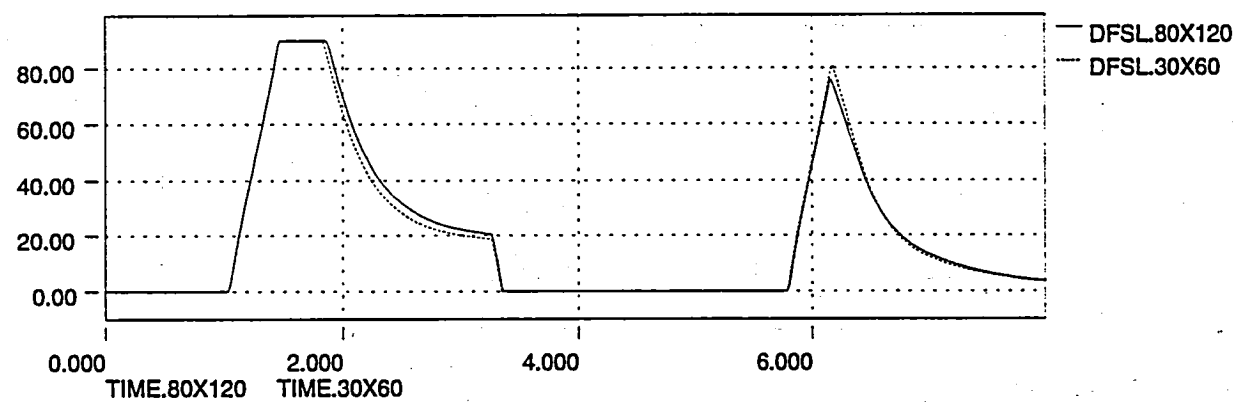
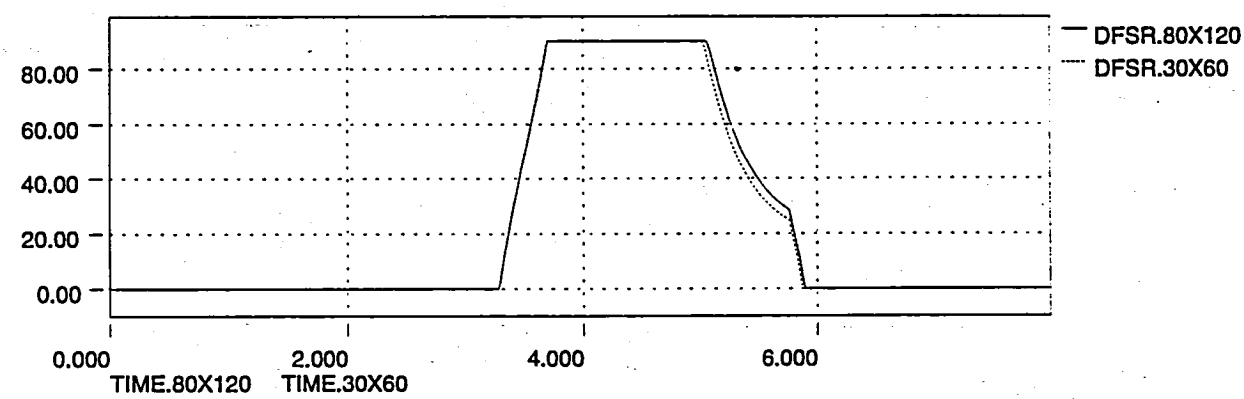
Figure 4 (Cont'd) - 2 inch Doublet/30 degrees AOA/25K page 2/2









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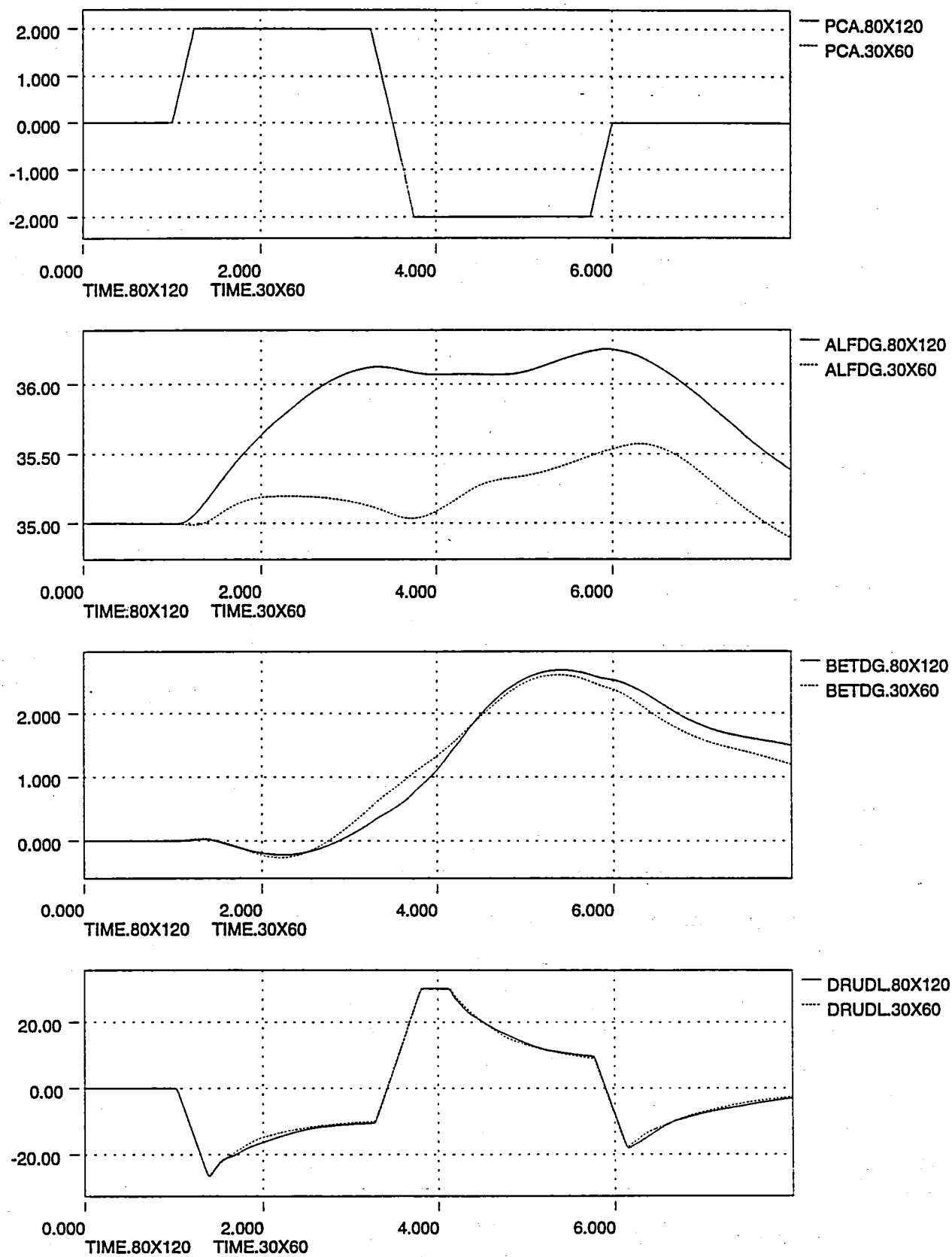

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Figure 5 (Cont'd) - 2 inch Doublet/35 degrees AOA/25K page 2/2

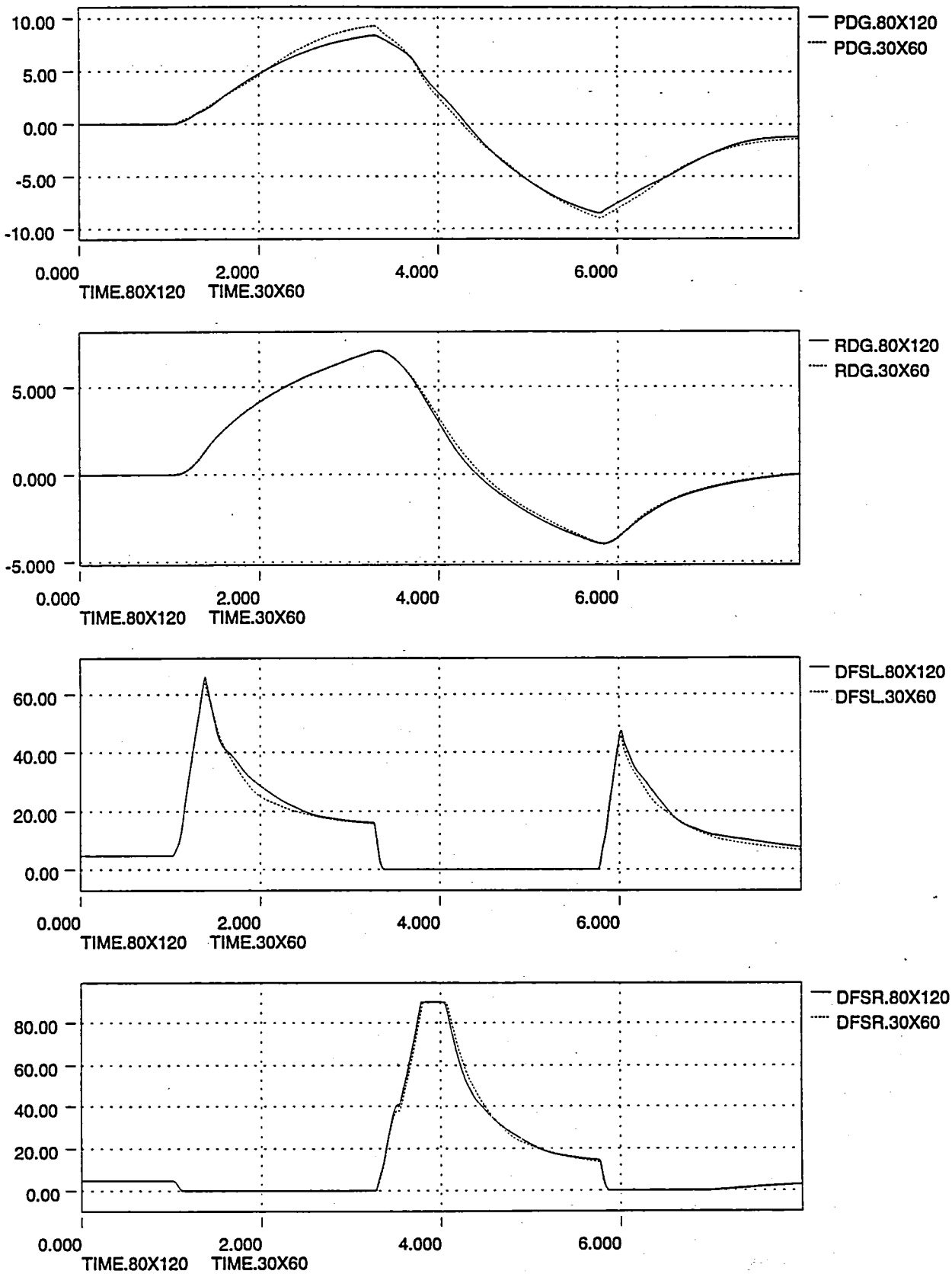

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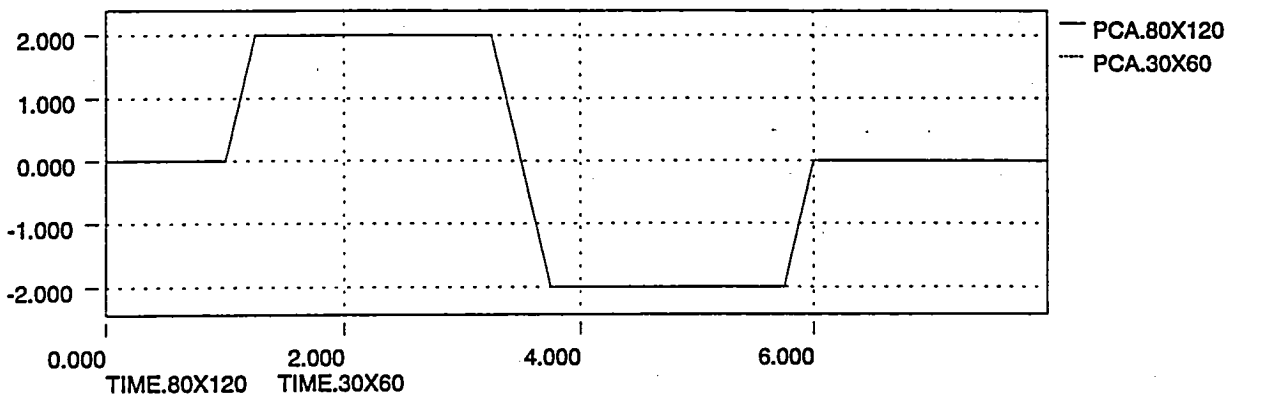
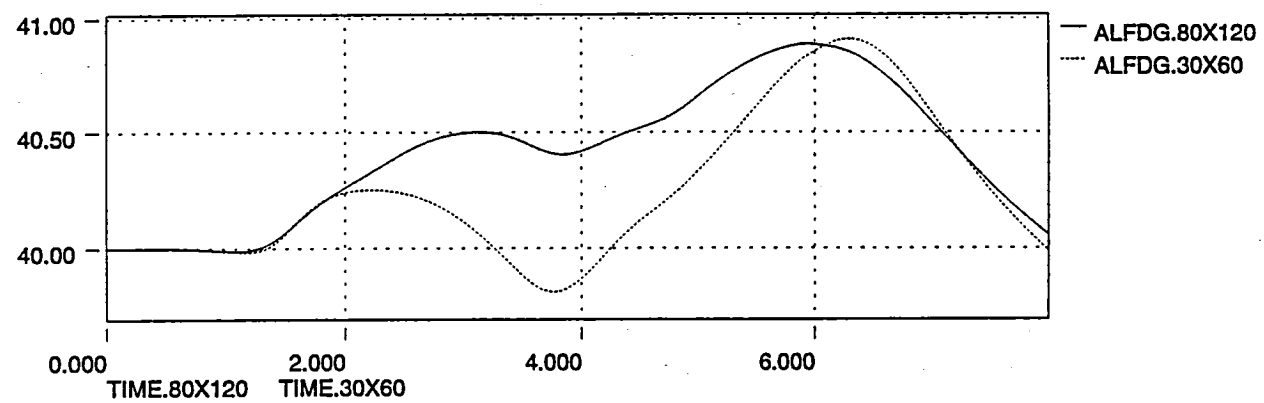
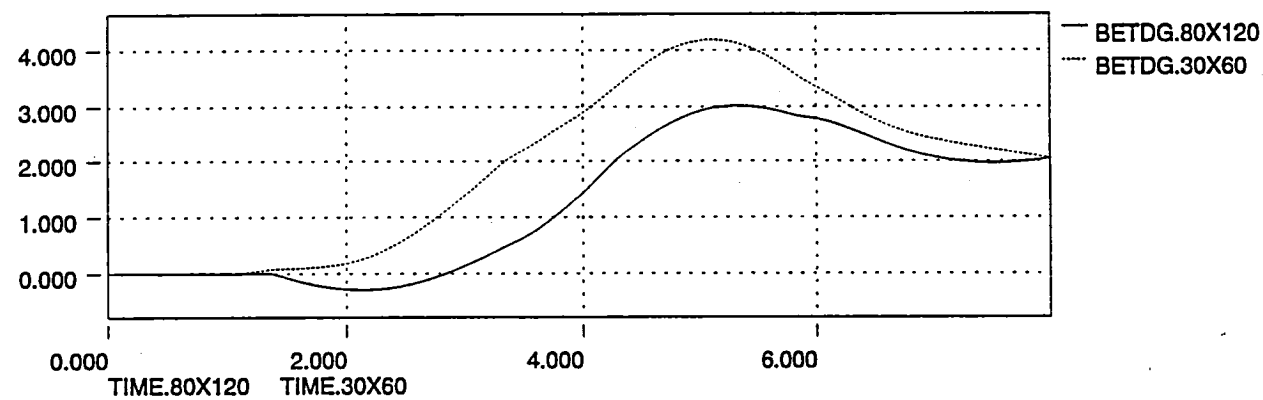
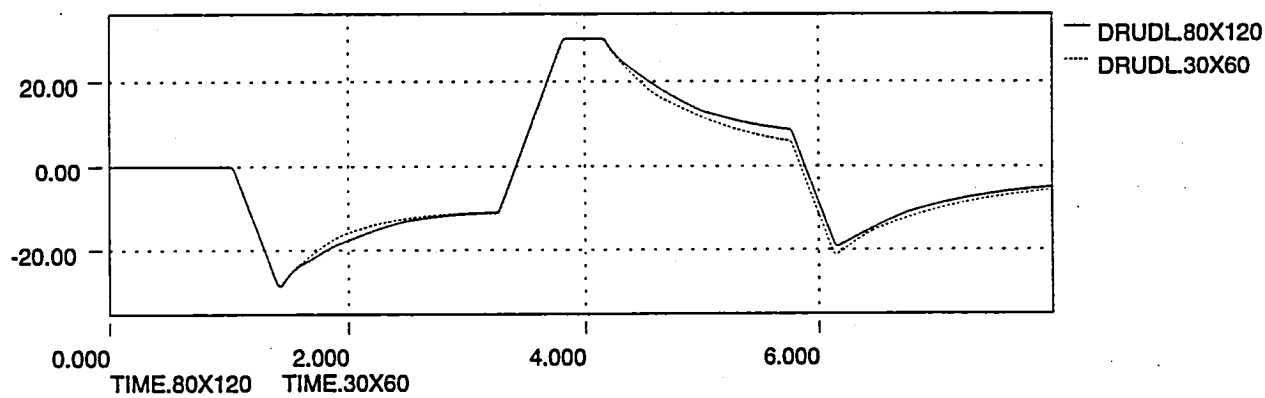
Figure 6 - 2 inch Doublet/40 degrees AOA/25K page 1/2









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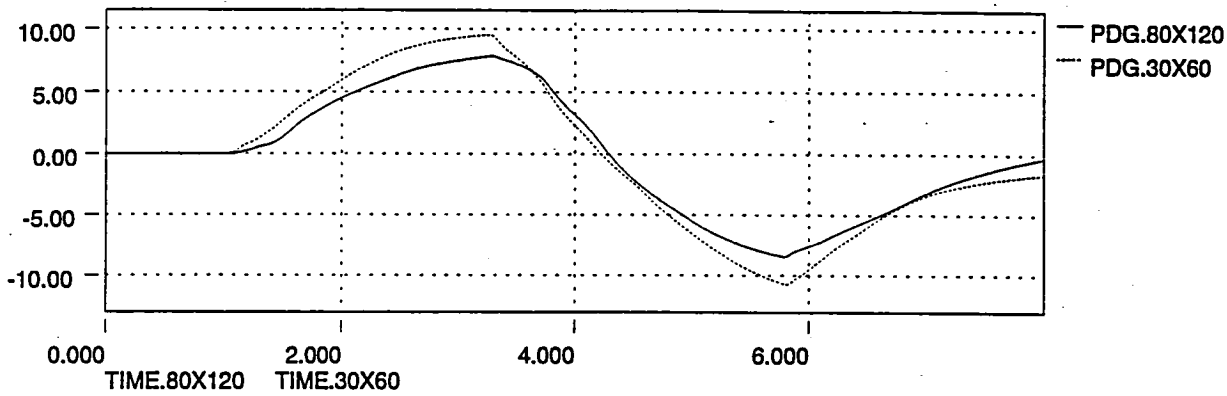

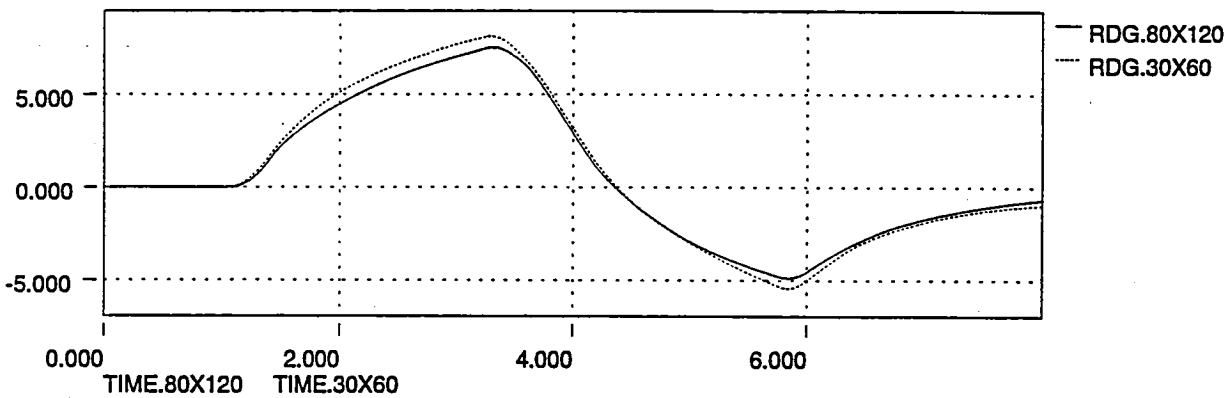

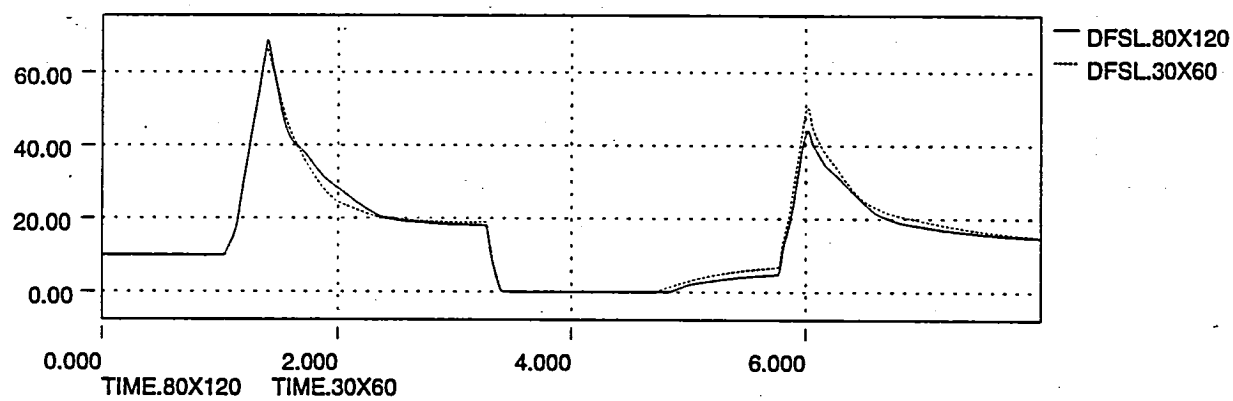

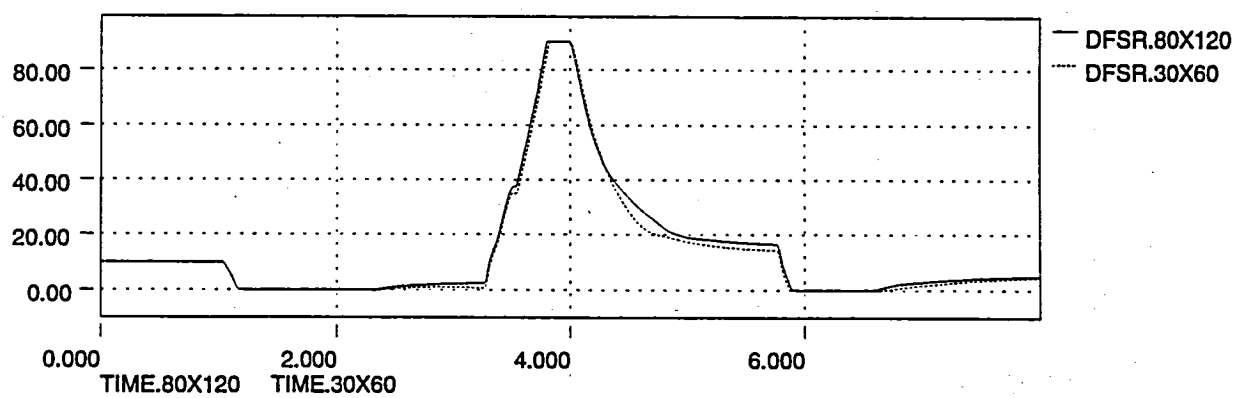

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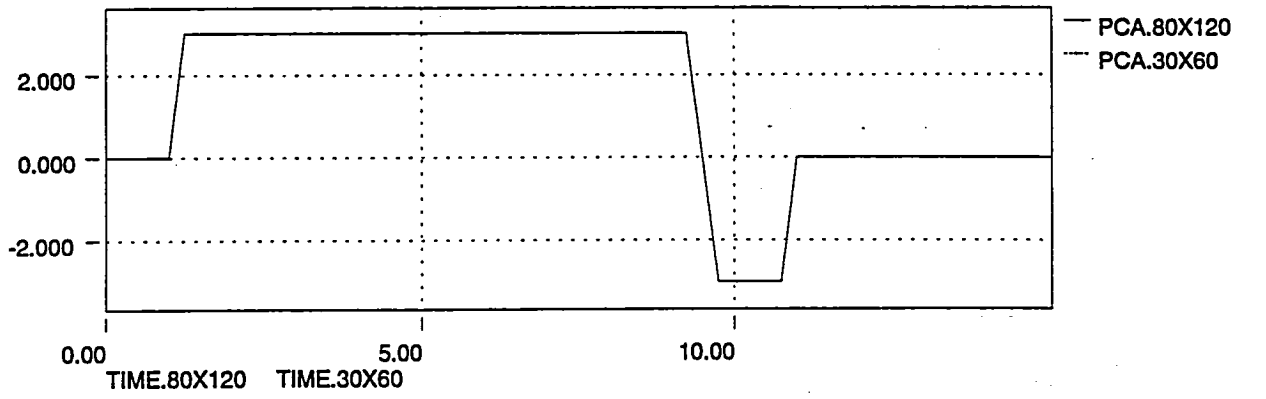
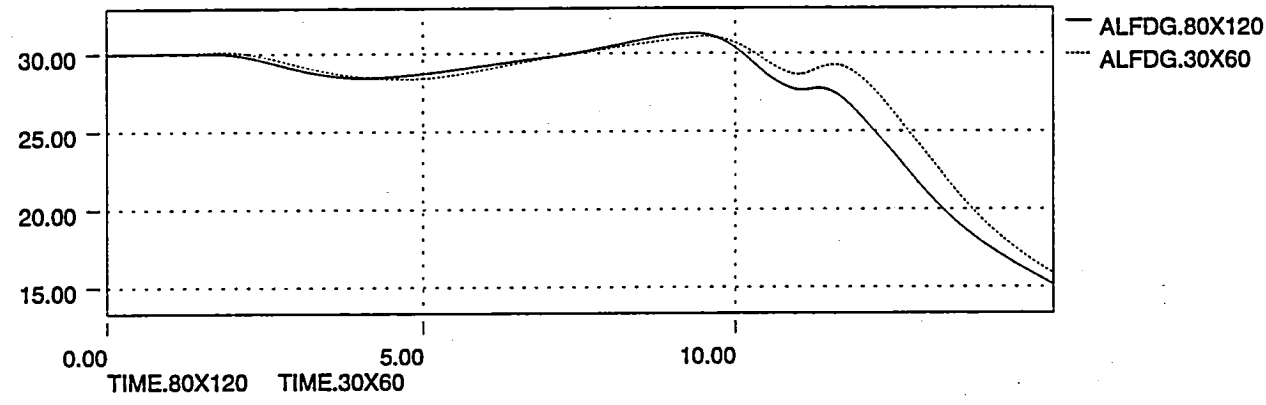
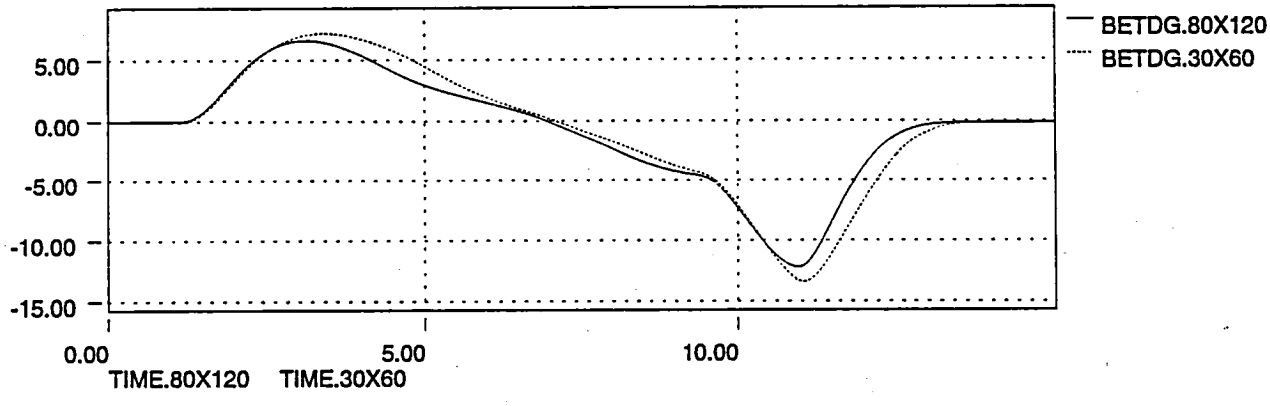
Figure 7 - 3 inch Doublet/30 degrees AOA/25K page 1/2







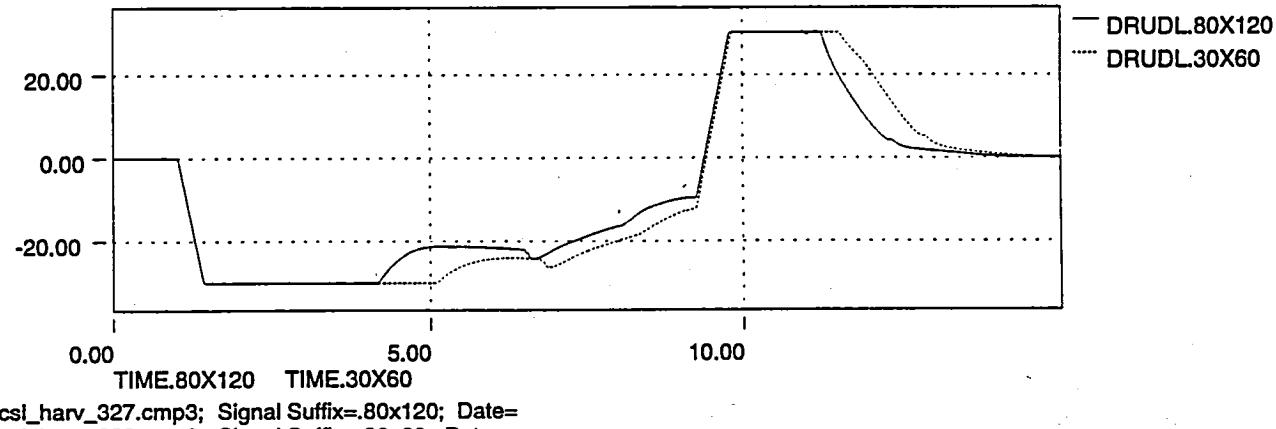


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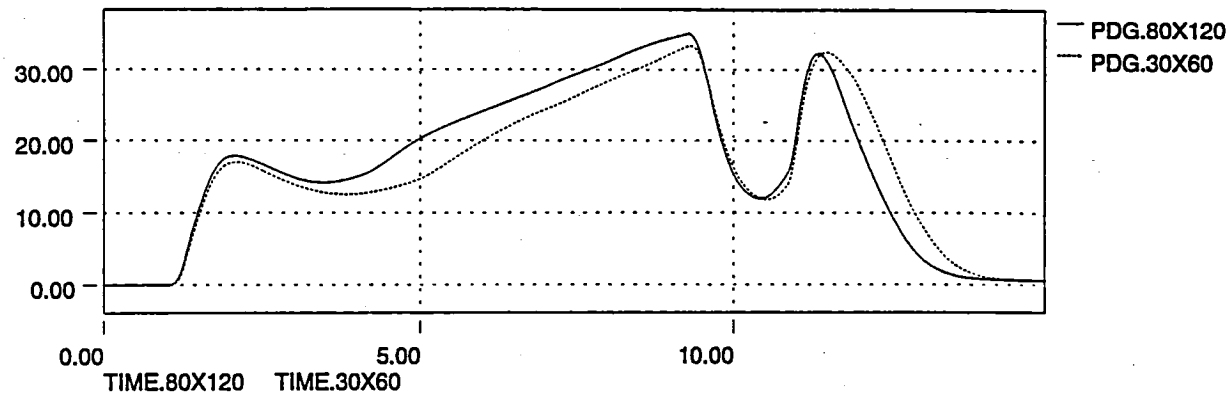
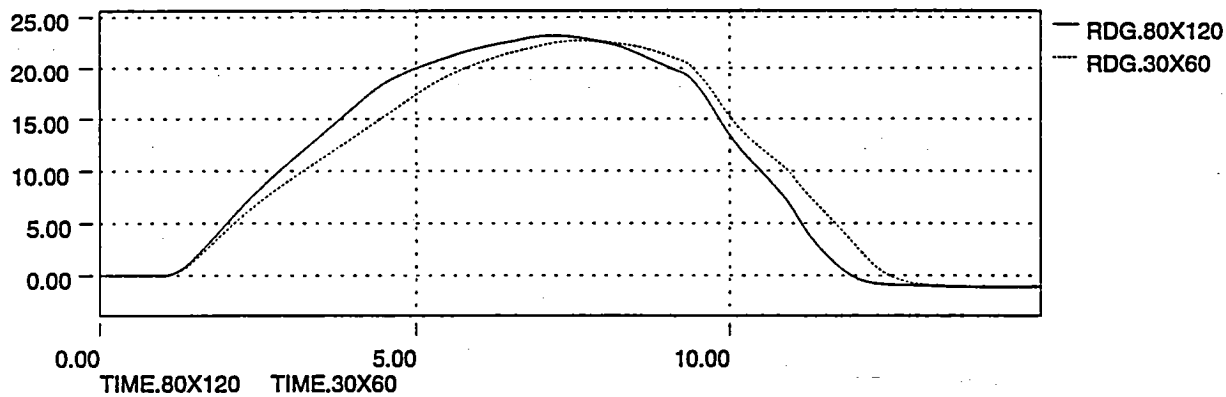
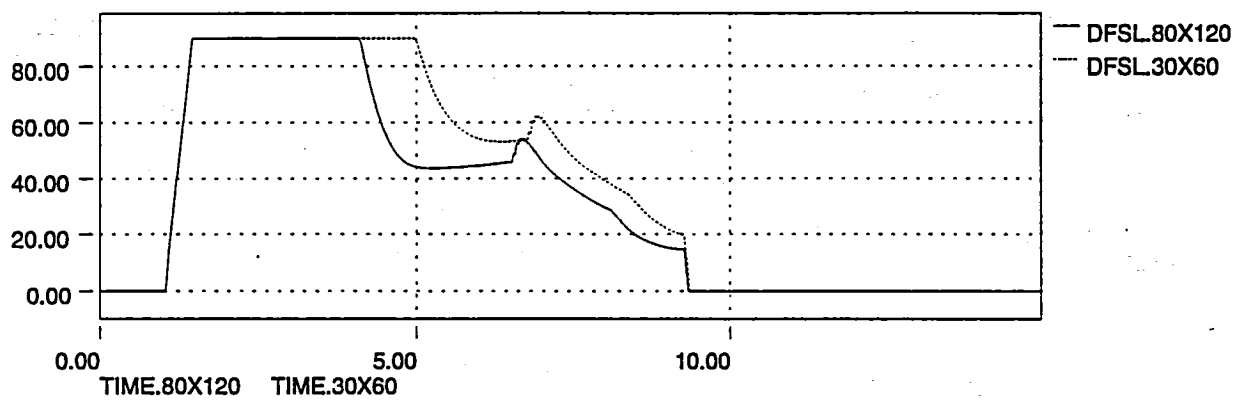
Figure 7 (Cont'd) - 3 inch Doublet/30 degrees AOA/25K page 2/2







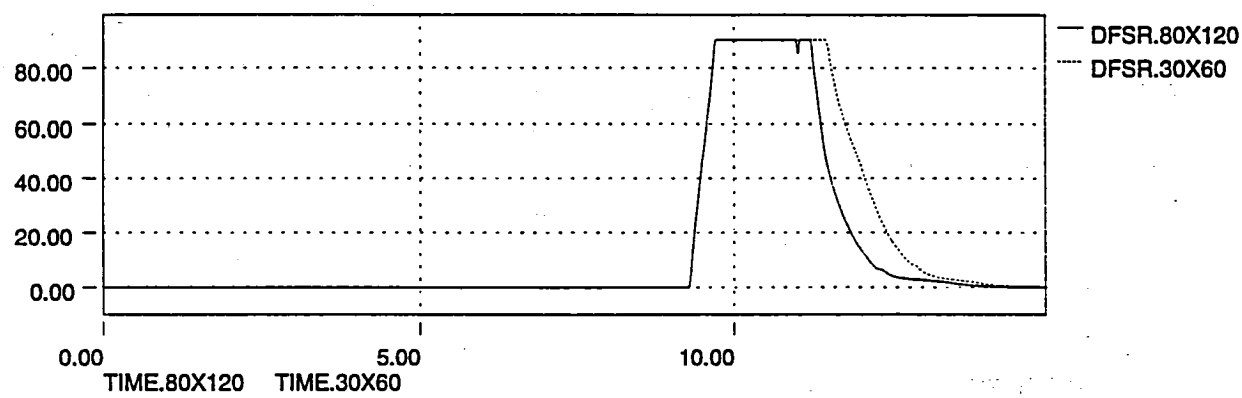


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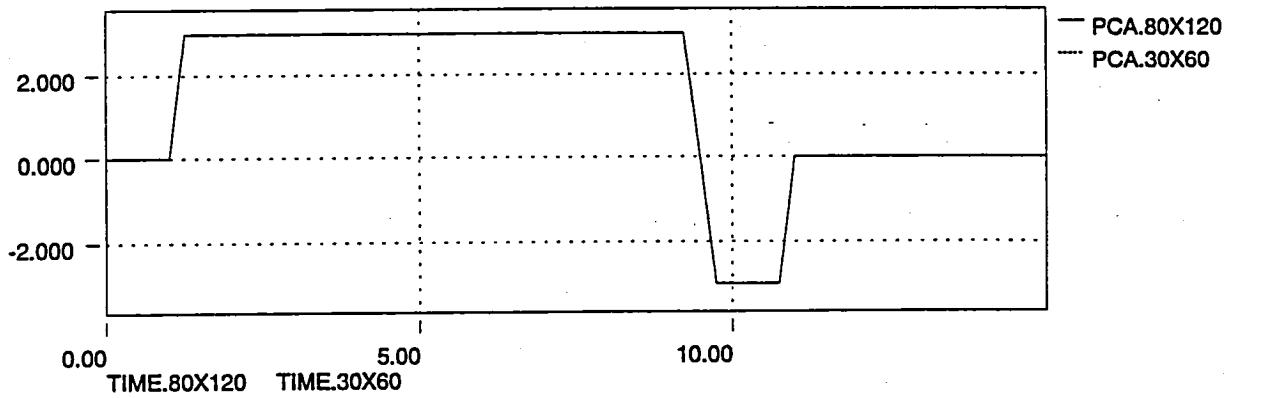
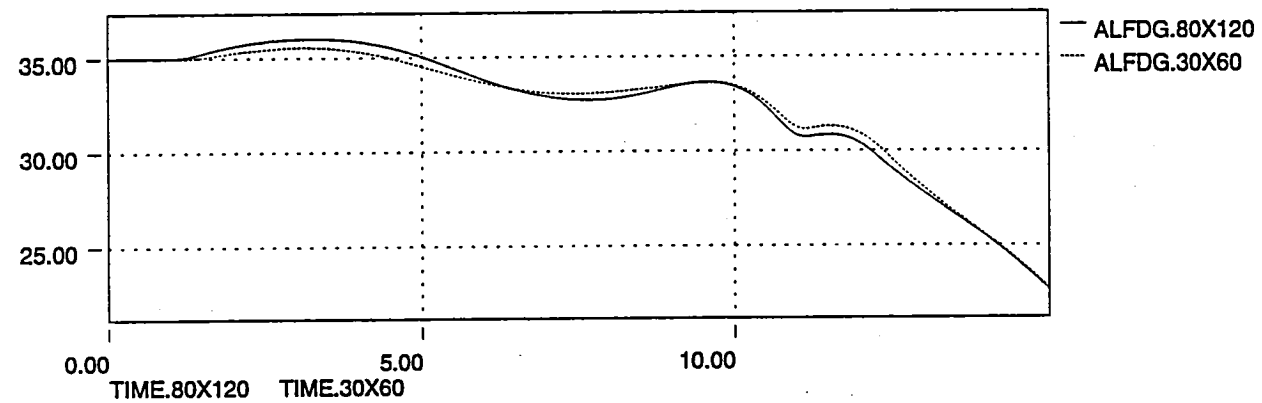
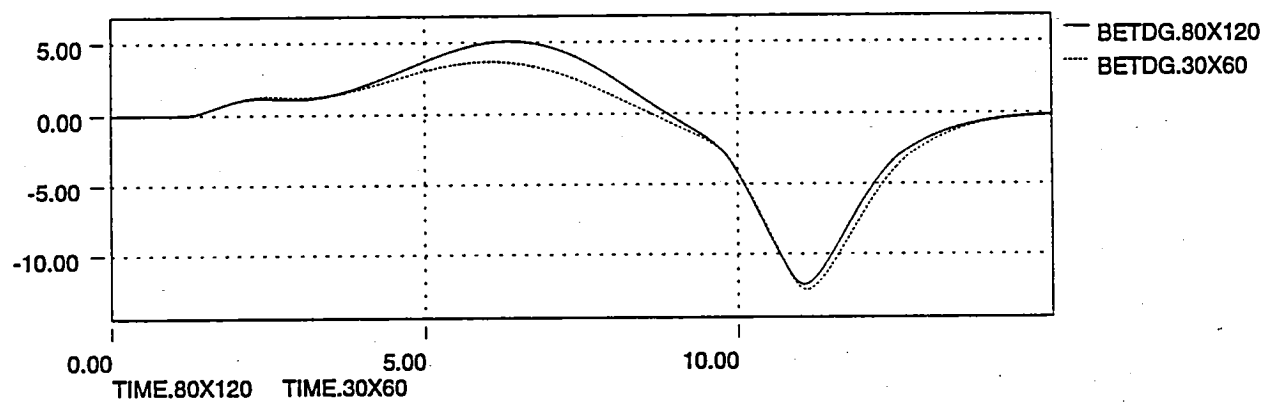
Figure 8 - 3 inch Doublet/35 degrees AOA/25K page 1/2







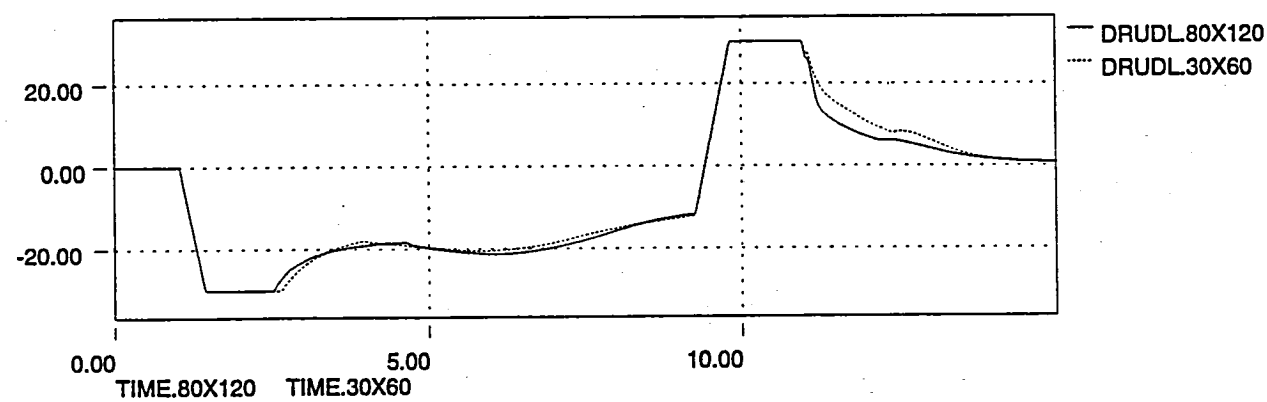


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Figure 8 (Cont'd) - 3 inch Doublet/35 degrees AOA/25K page 2/2

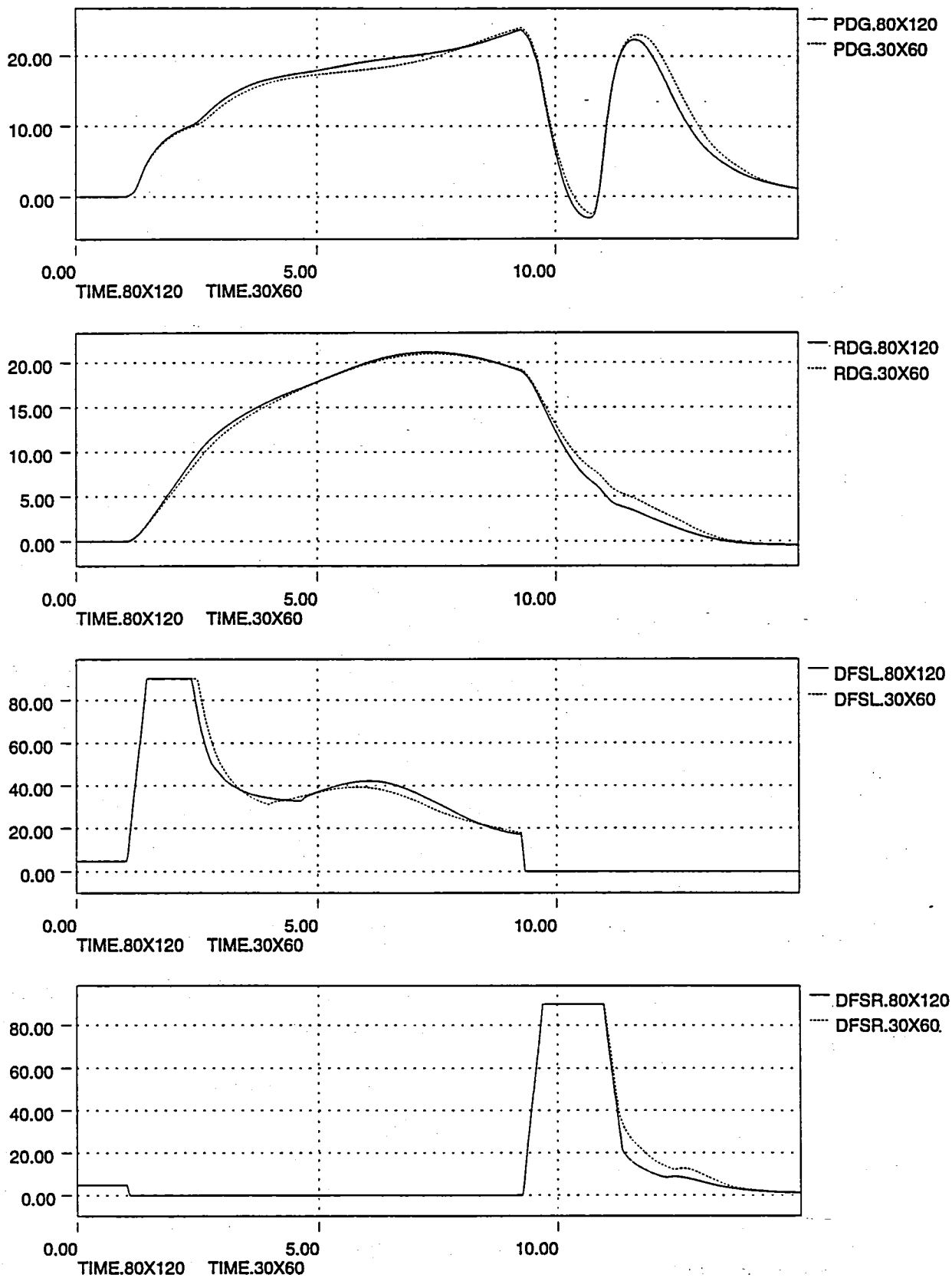

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Figure 9 - 3 inch Doublet/40 degrees AOA/25K page 1/2

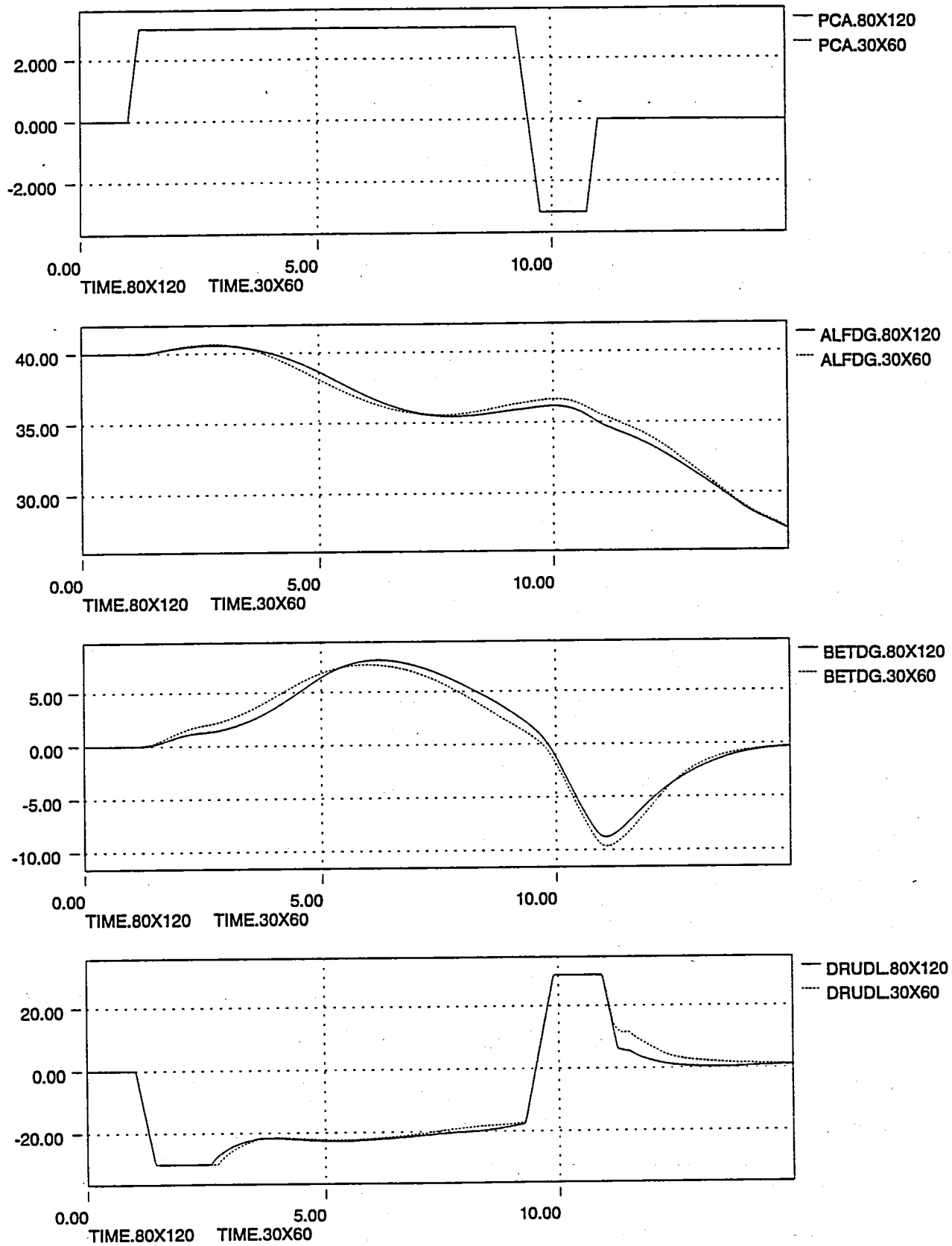

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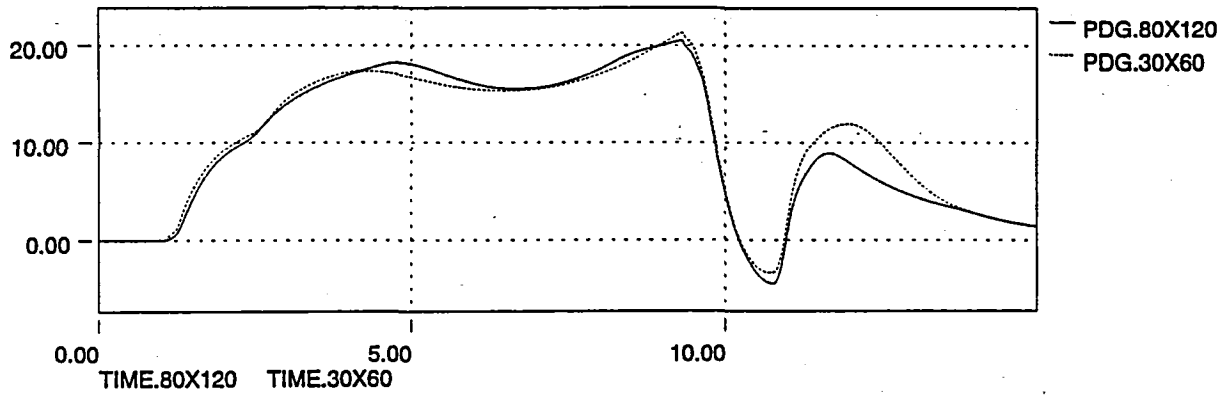
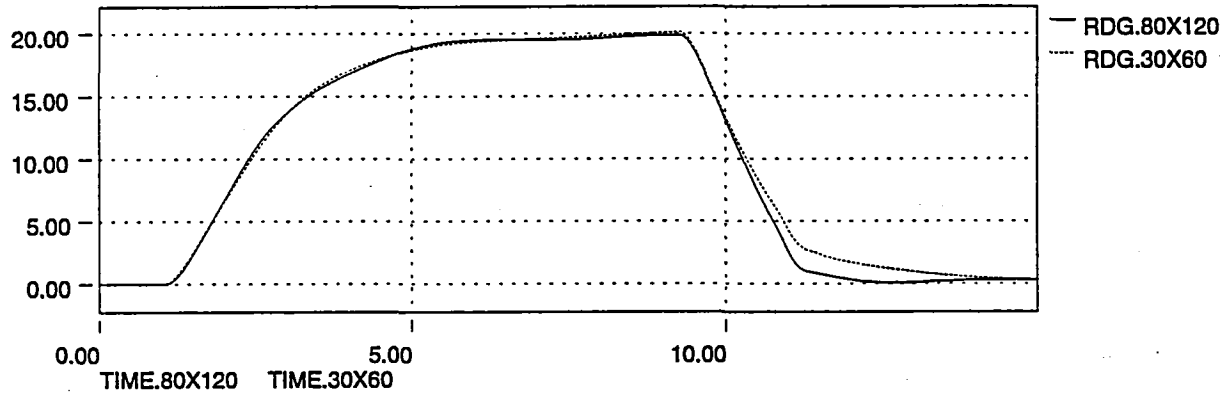
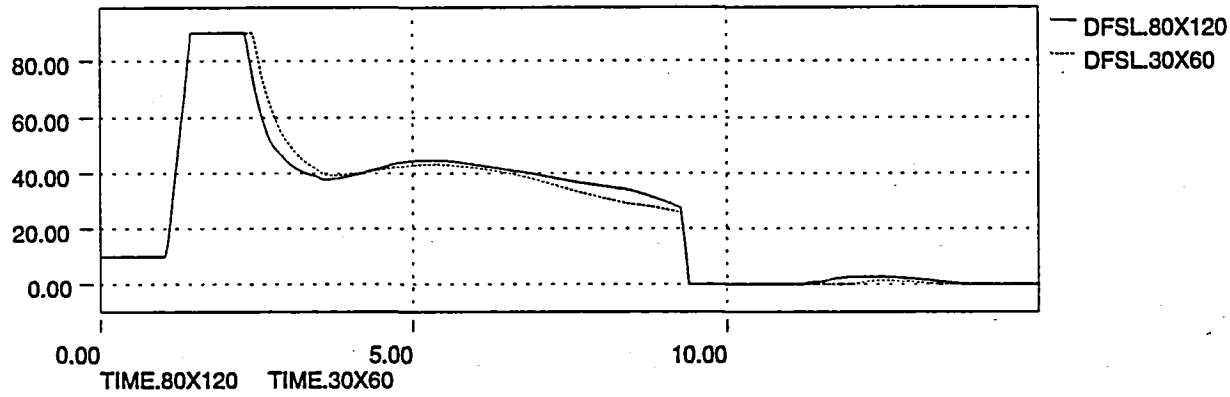
Figure 9 (Cont'd) - 3 inch Doublet/40 degrees AOA/25K page 2/2







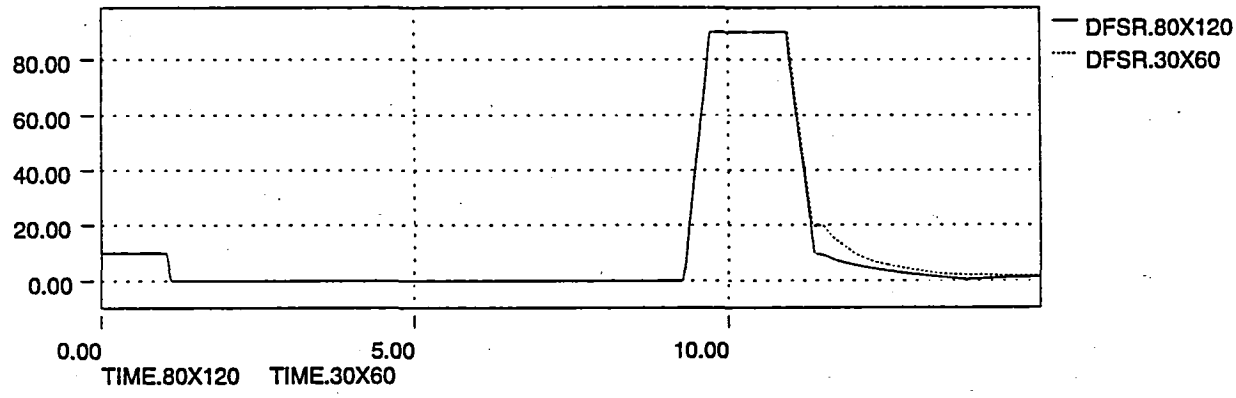


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Figure 10 - 50 lb Pedal Doublet/40 degrees AOA/25K S Mode

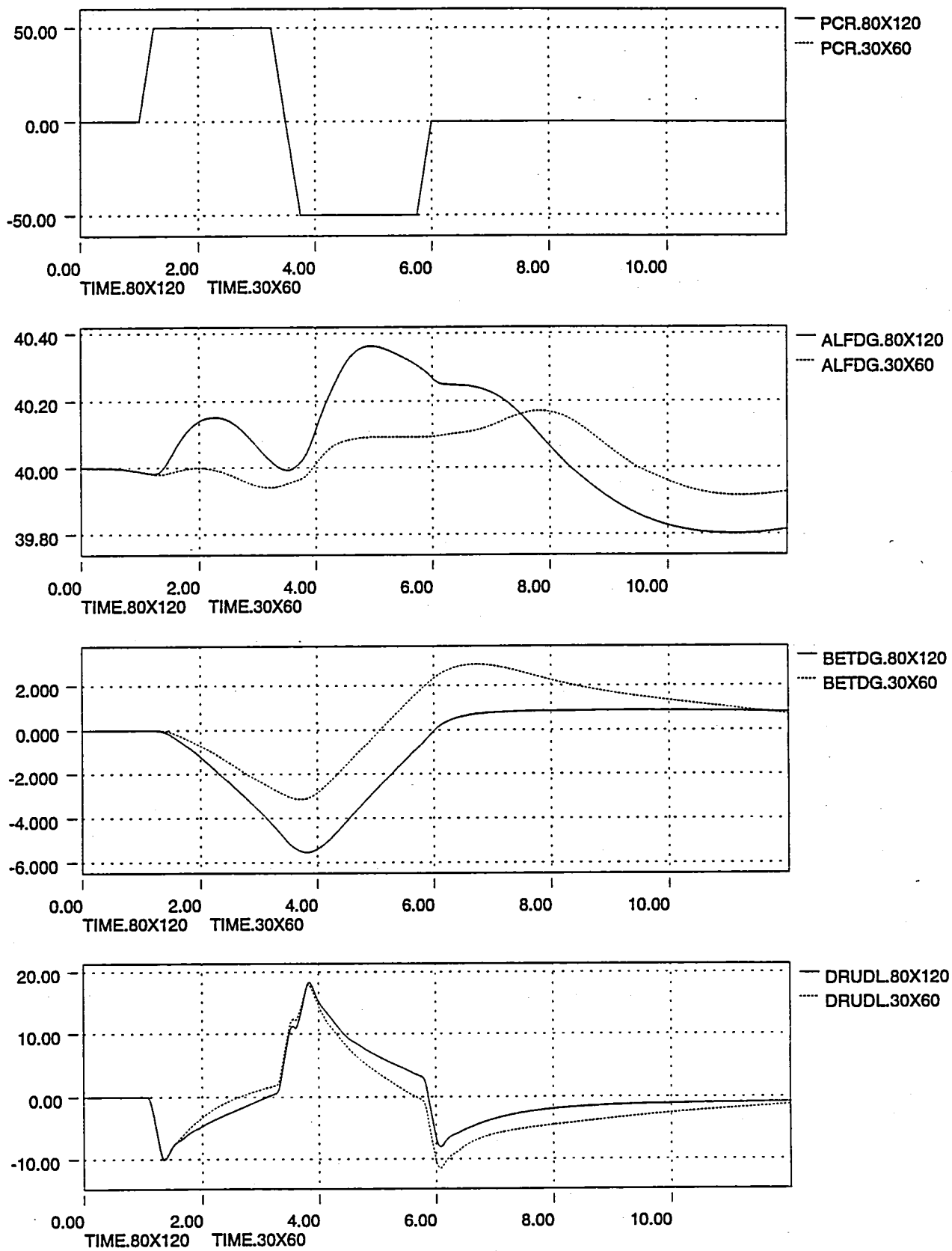

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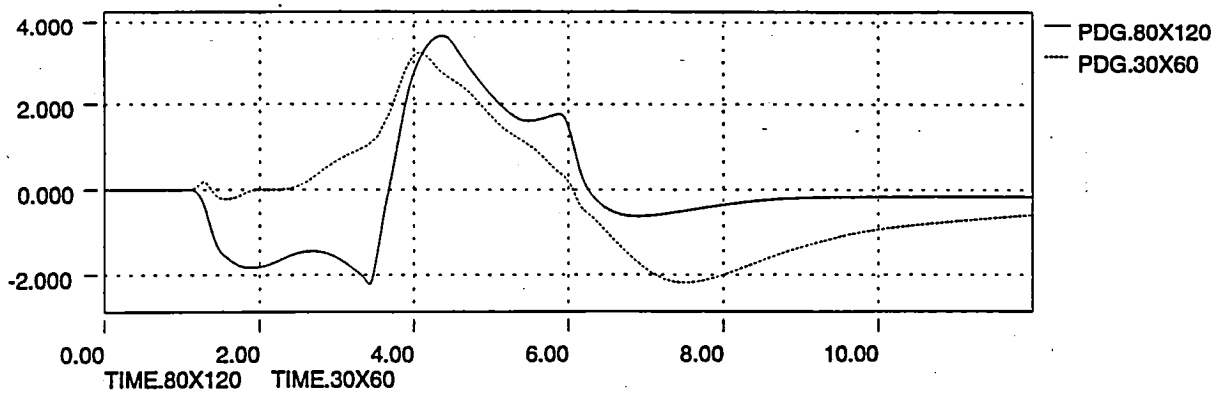
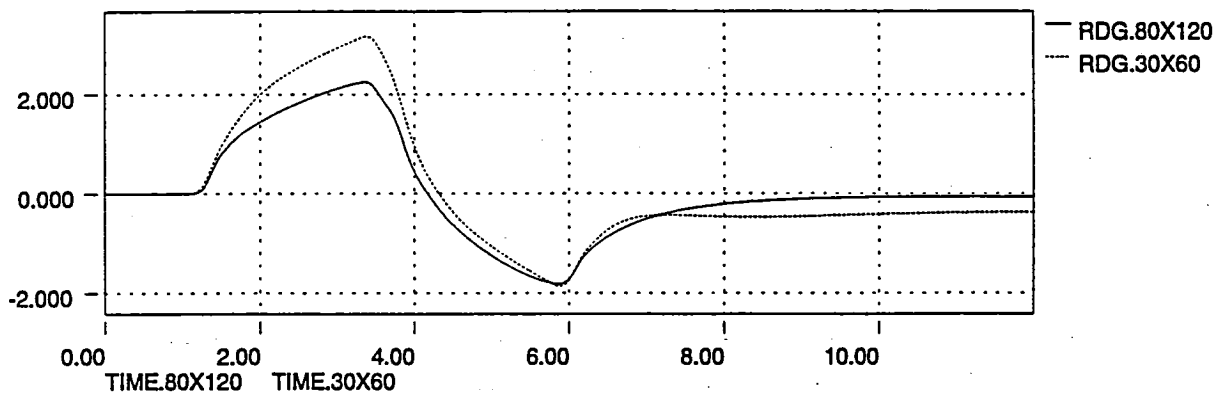
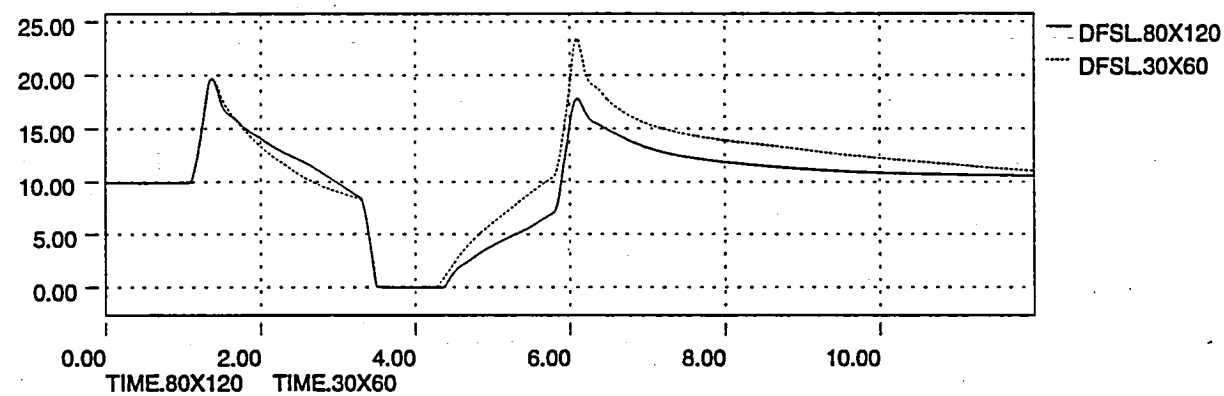
Figure 10 (Cont'd) - 50 lb Pedal Doublet/40 degrees AOA/25K page 2/2
S Mode







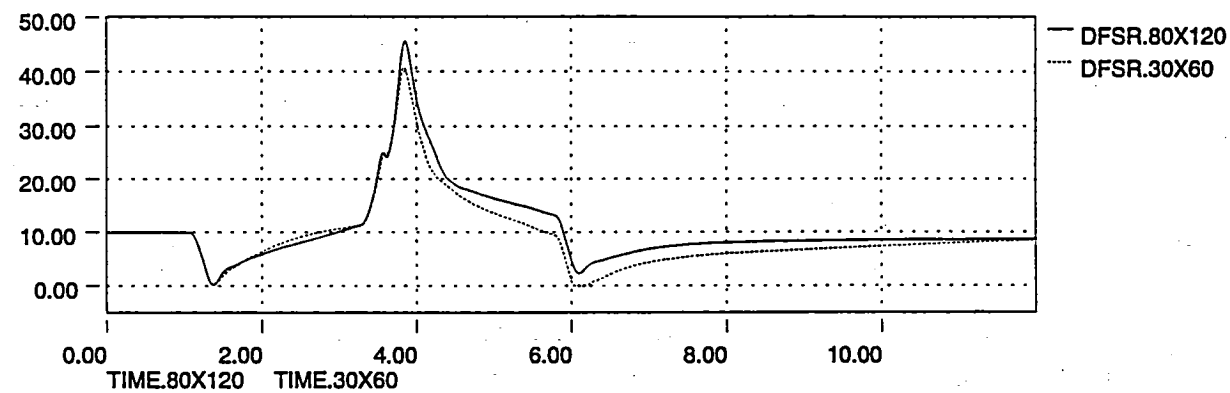


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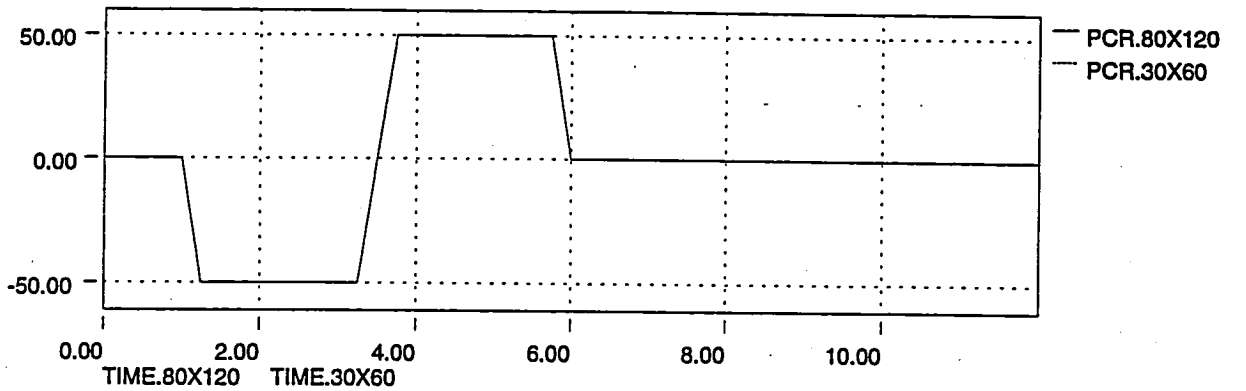
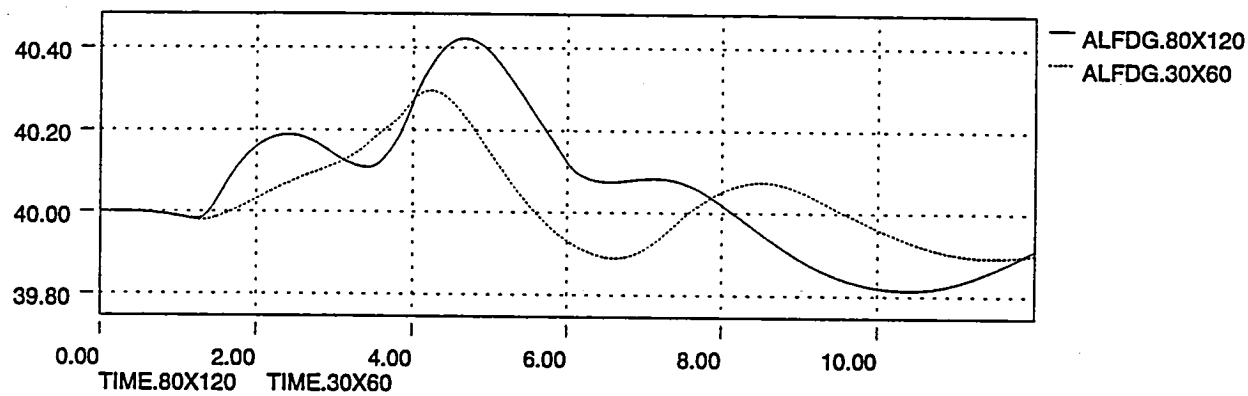
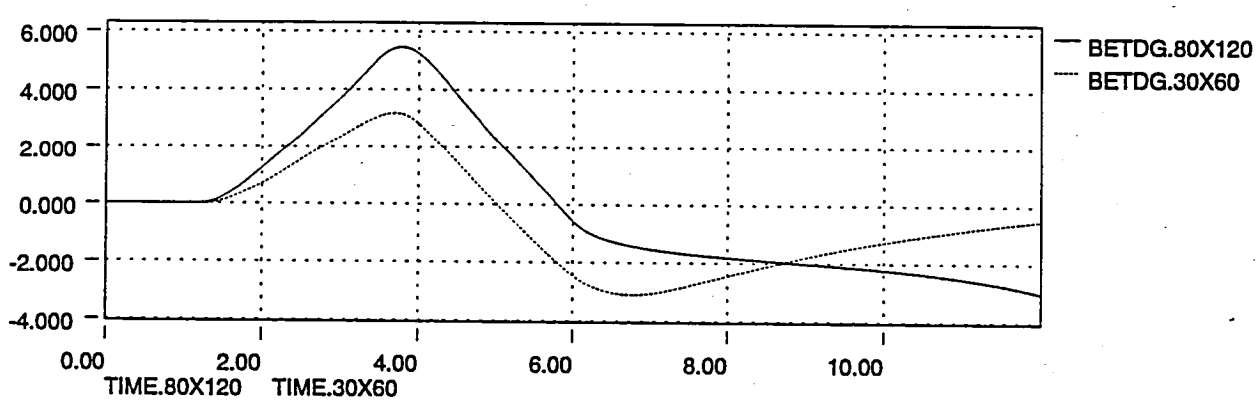
Figure 11 - 50 lb Pedal Doublet/40 degrees AOA/25K S Mode

Fri May 5 09:12:58 1995







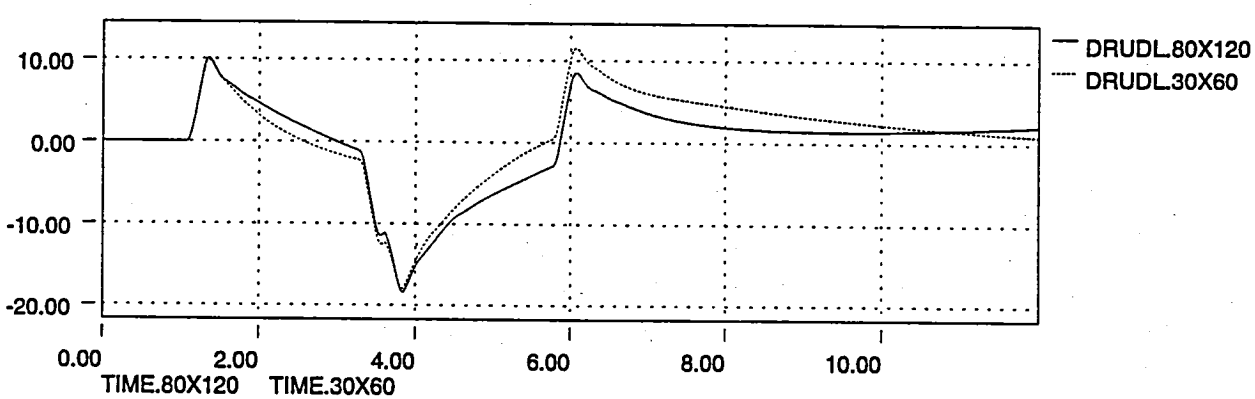


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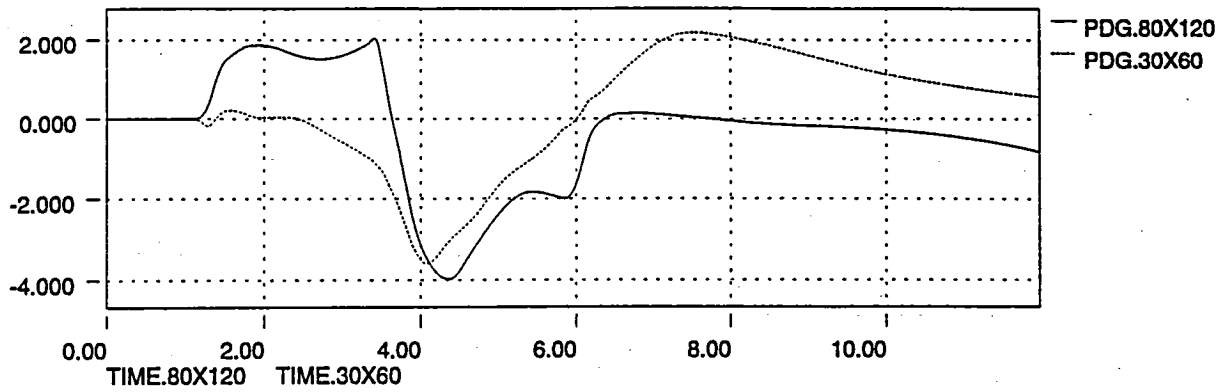
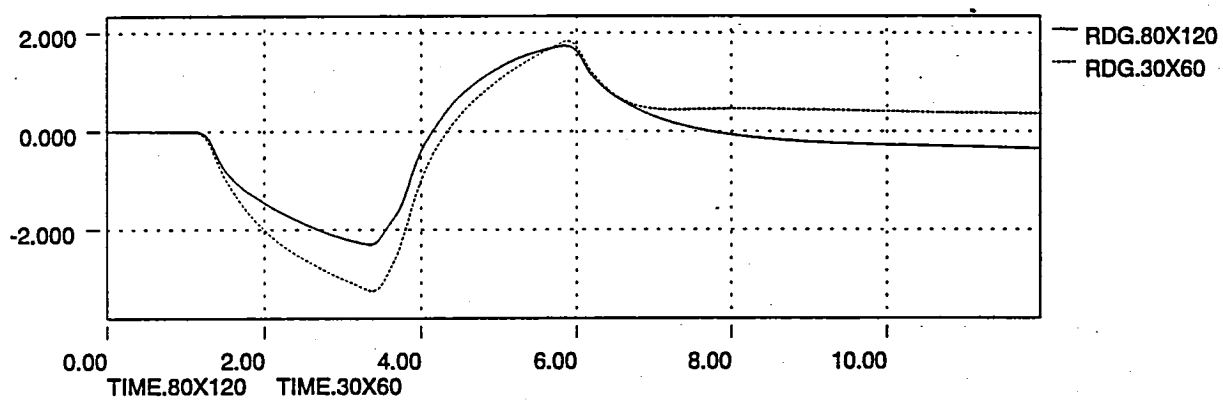
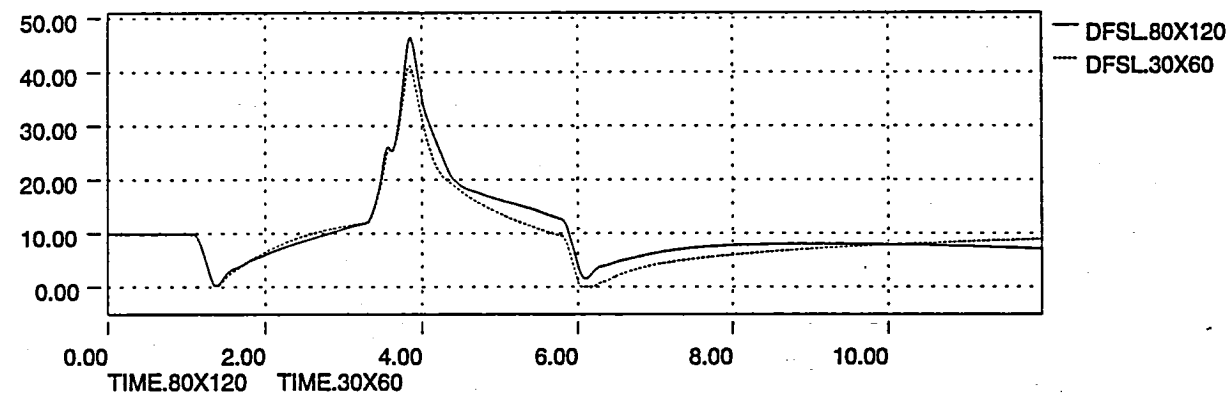
Figure 11 (Cont'd) - 50 lb Pedal Doublet/40 degrees AOA/25K page 2/2
S Mode







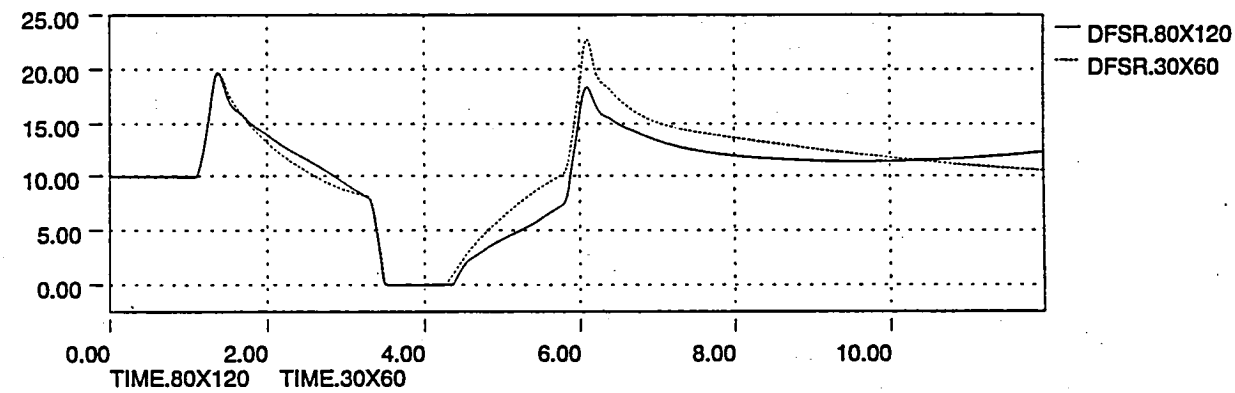


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Figure 12 - 100 lb Pedal Doublet/40 degrees AOA/25K S Mode page 1/2

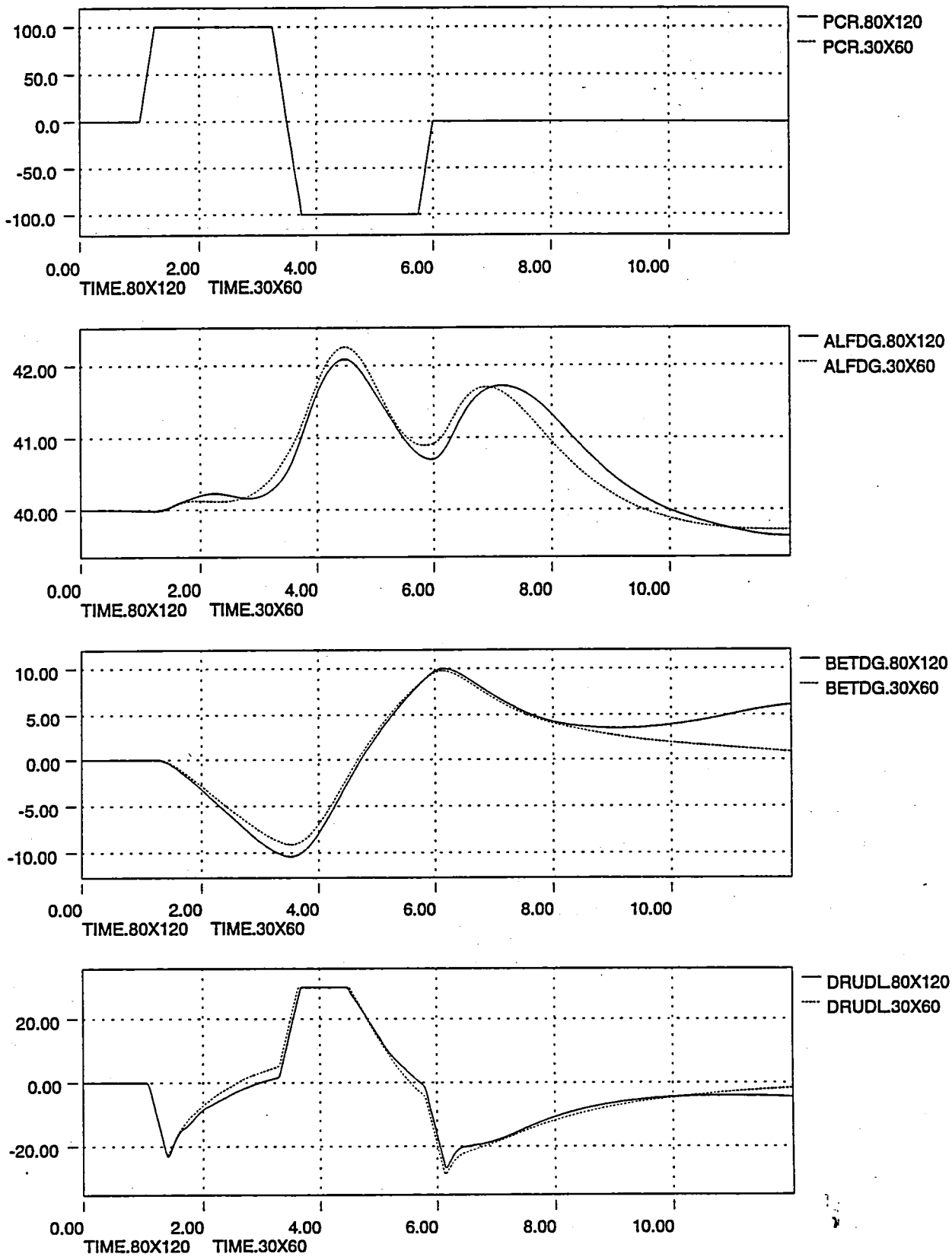

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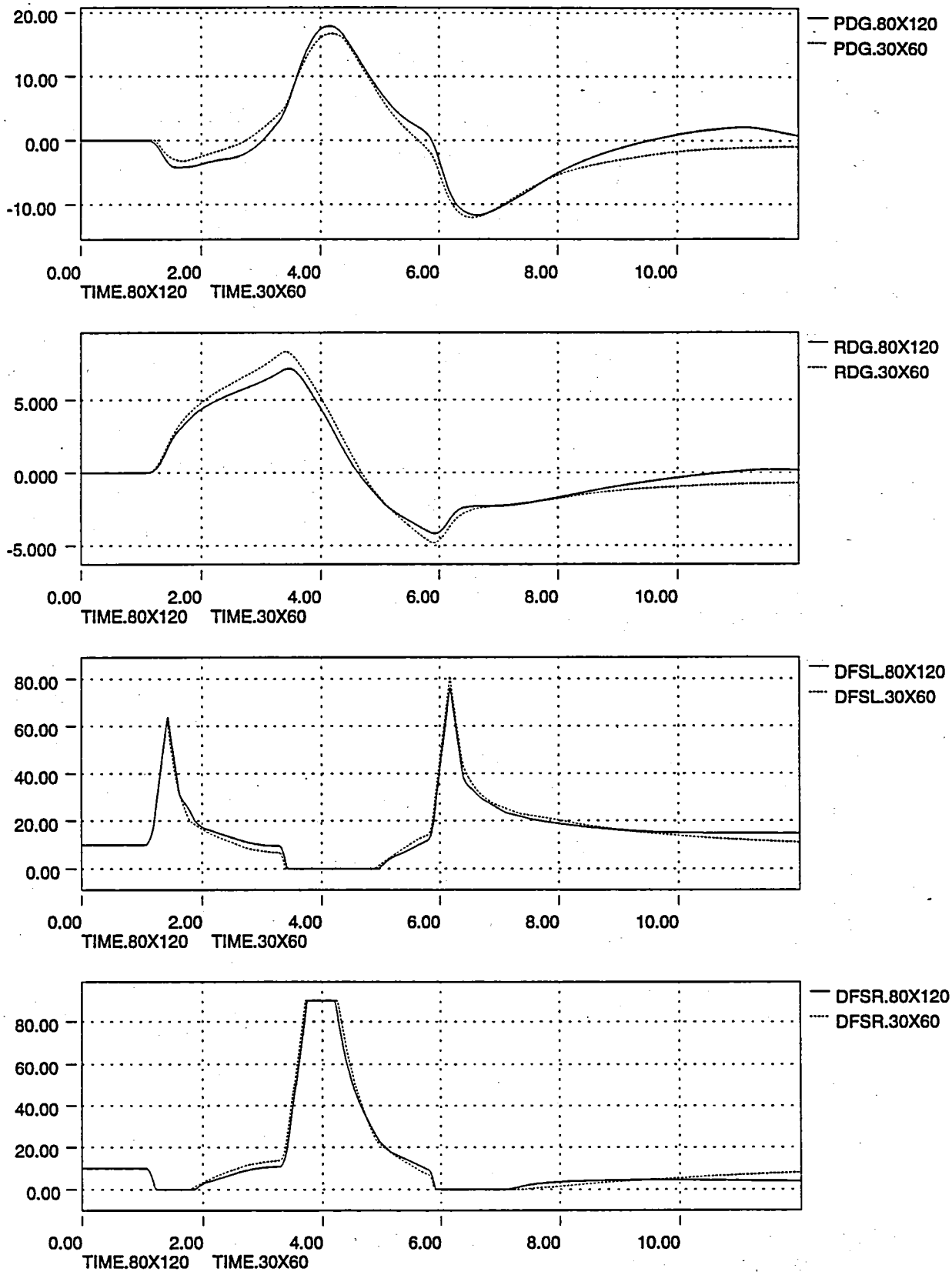
Figure 12 (Cont'd) - 100 lb Pedal Doublet/40 degrees AOA/25K page 2/2
S Mode



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Fri May 5 09:24:24 1995

Figure 13 - 2 inch Pitch Doublet/40 degrees AOA/25K S Mode

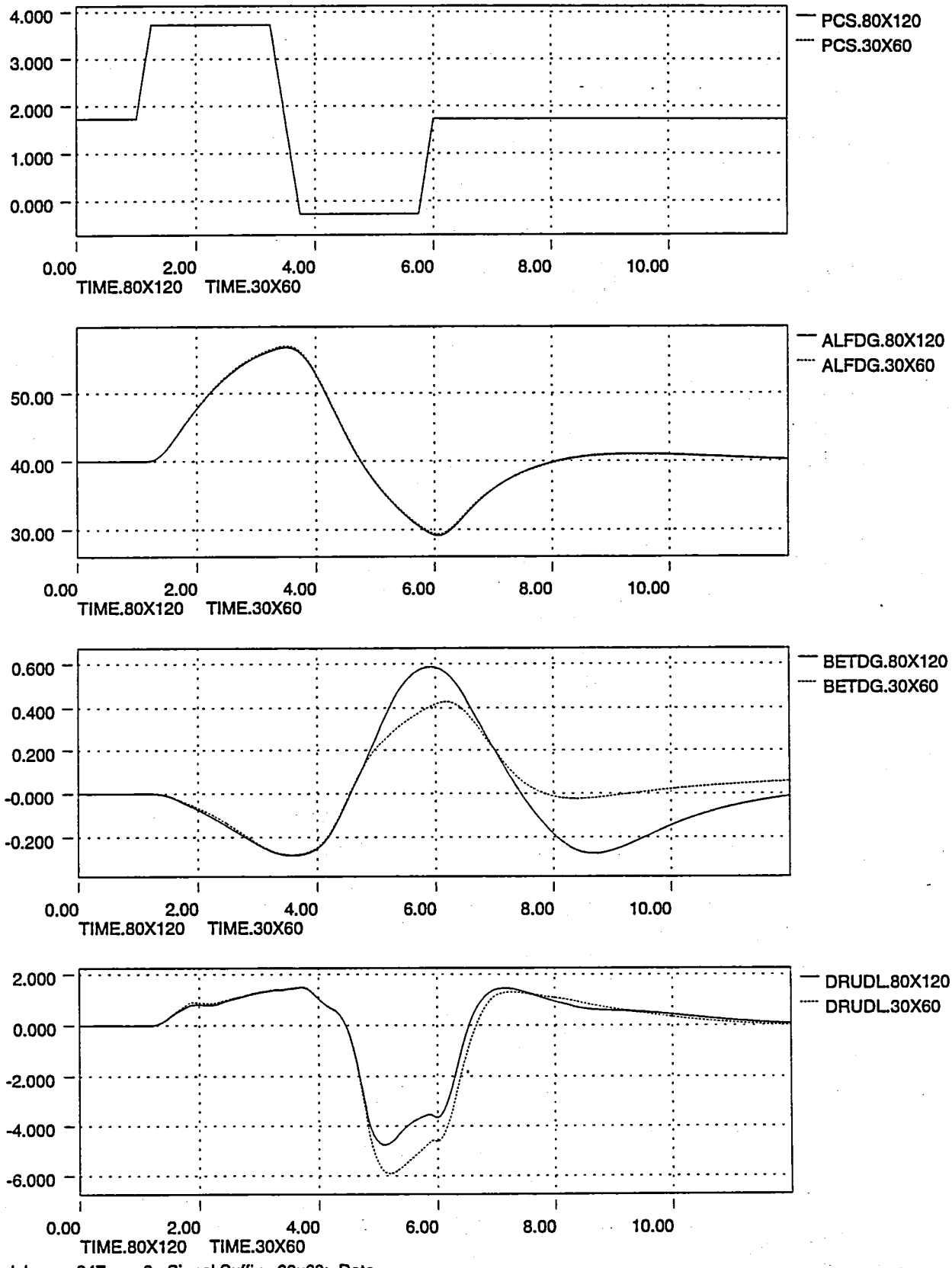

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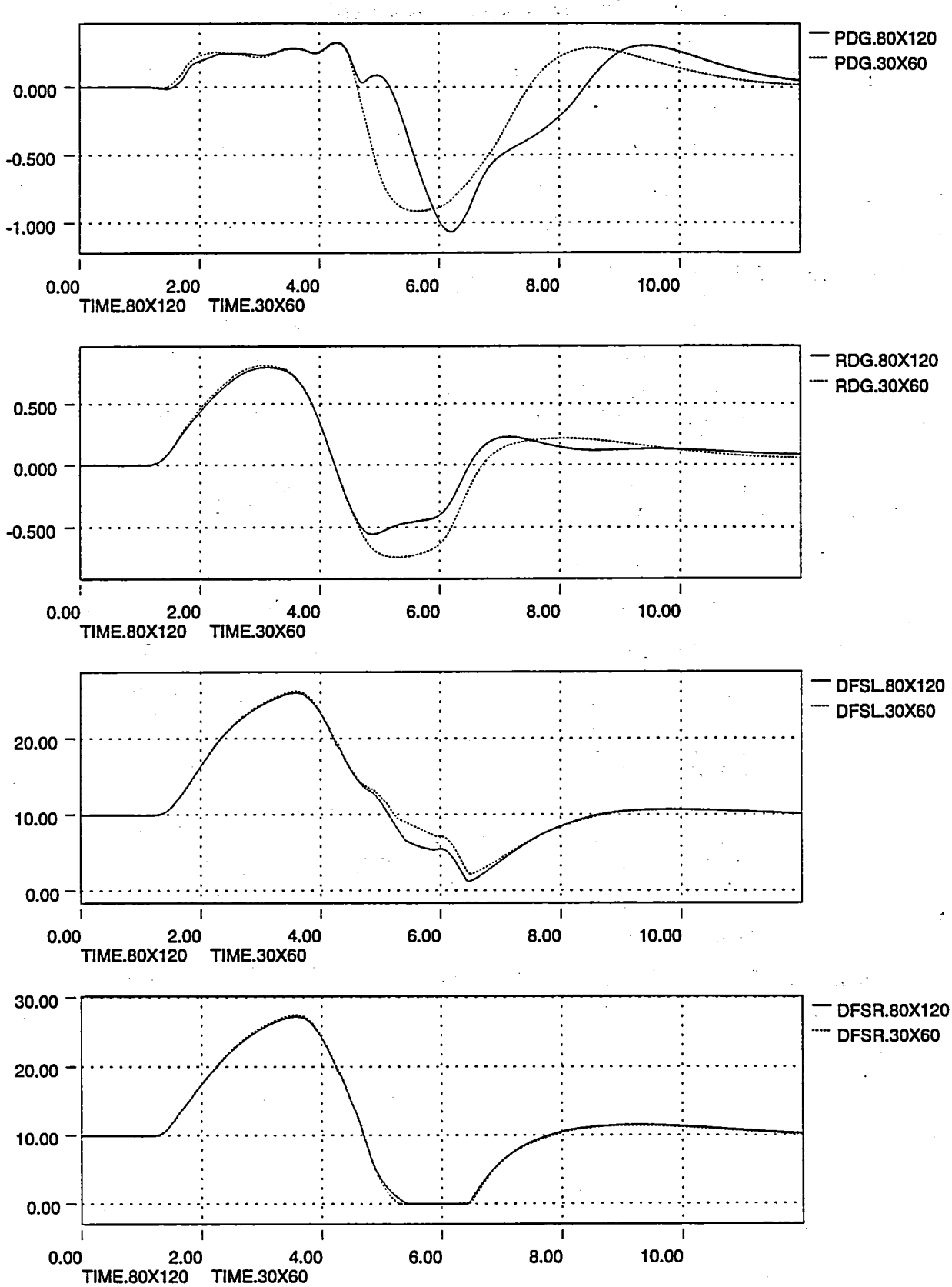
Figure 13 (Cont'd) - 2 inch Pitch Doublet/40 degrees AOA/25K page 2/2
S Mode



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Enclosure 2

To: Tom Bundick, Dan Murri, John Foster, Dana Dunham, John Davidson, Pat Murphy, Fred Lallman, Aaron Ostroff

From: Keith Hoffler (ViGYAN, Inc.)
Mike Messina (Lockheed)

Subject: DMS comparison of Ames 80x120 and Langley 30x60 strake data

Note: Strake increments from the Ames 80x120 data was only implemented in the α range from 30° to 40°. Therefore all testing was done in that region.

What we did: Phil Brown was the pilot. He flew the two data bases back to back and gave comments and ratings for various lateral/directional maneuvers conducted in the 30° to 40° α range. The maneuvers flown were: 1) 1-g 360° rolls at $\alpha = 35°$, 2) Loaded roll at Mach 0.4 and $\alpha = 35°$, 3) Target tracking from $\alpha = 30°$ to 40°, and 4) target acquisition at $\alpha = 35°$. All four maneuvers were flown in the "S" mode. The target acquisition maneuvers were also flown in the "STV" mode.

The results: Differences were very small. The CHR's varied by no more than 0.5 between the two data bases. Level one ratings were obtained for both data bases for the 1-g and loaded rolls and the tracking tasks. CHR of 5 was given for the lateral target acquisition tasks.

There were two differences that seem worth mentioning:

1) The bank angle capture after the loaded rolls worked well for both but the 30x60 data allowed the pilot to hold the bank angle longer after the initial capture. I'm not sure why this was the case. Note that the bank angle of 90° can not be held long without building up a large beta due to gravity. The only difference observed between the two runs was a larger beta excursion during/after the capture with the 80x120 data.

2) The acquisition tasks were slightly easier with the 80x120 data for both "S" and "STV" modes. Phil's comments were that the yaw accelerations were slightly better and it was a little more precise with the 80x120 data. The ratings were the same. He also commented that the "STV" mode yielded significantly better rates and was more predictable. However, again ratings did not change.

Bottom line: From the pilot's point of view there was no significant difference between the two data bases.

2 - Large Directional Control Commands around 40° AOA.

Longitudinal stick doublet results showed large uncommanded directional spikes as the time history passed through 40 degrees AOA. (See Figure 1) This discrepancy was duplicated in batch using the same method discussed under HIL issue 1 and found to be due to the same lateral/directional sensitivity problem. (See Figure 2) As a result of the ANSER lateral/directional control law changes made in CCR 829, the large directional spikes were reduced. The lateral/directional gain changes in CCR 829 close out the need for further action on this discrepancy. Figure 3 contains the time histories for this checkcase after the changes in CCR 829 are implemented. These time history plots will differ versus the ones included in Appendix B for this same checkcase. This is due to the fact that impact pressure in the batch simulation was modified in this run to better approximate the HIL simulation.

Figure 1 - H/L Issue 2

CASE_22__S_Mode__30alp-35k_Max_AB_2_in_ramp_dep page 1/12

Tue Feb 7 11:32:17 1995

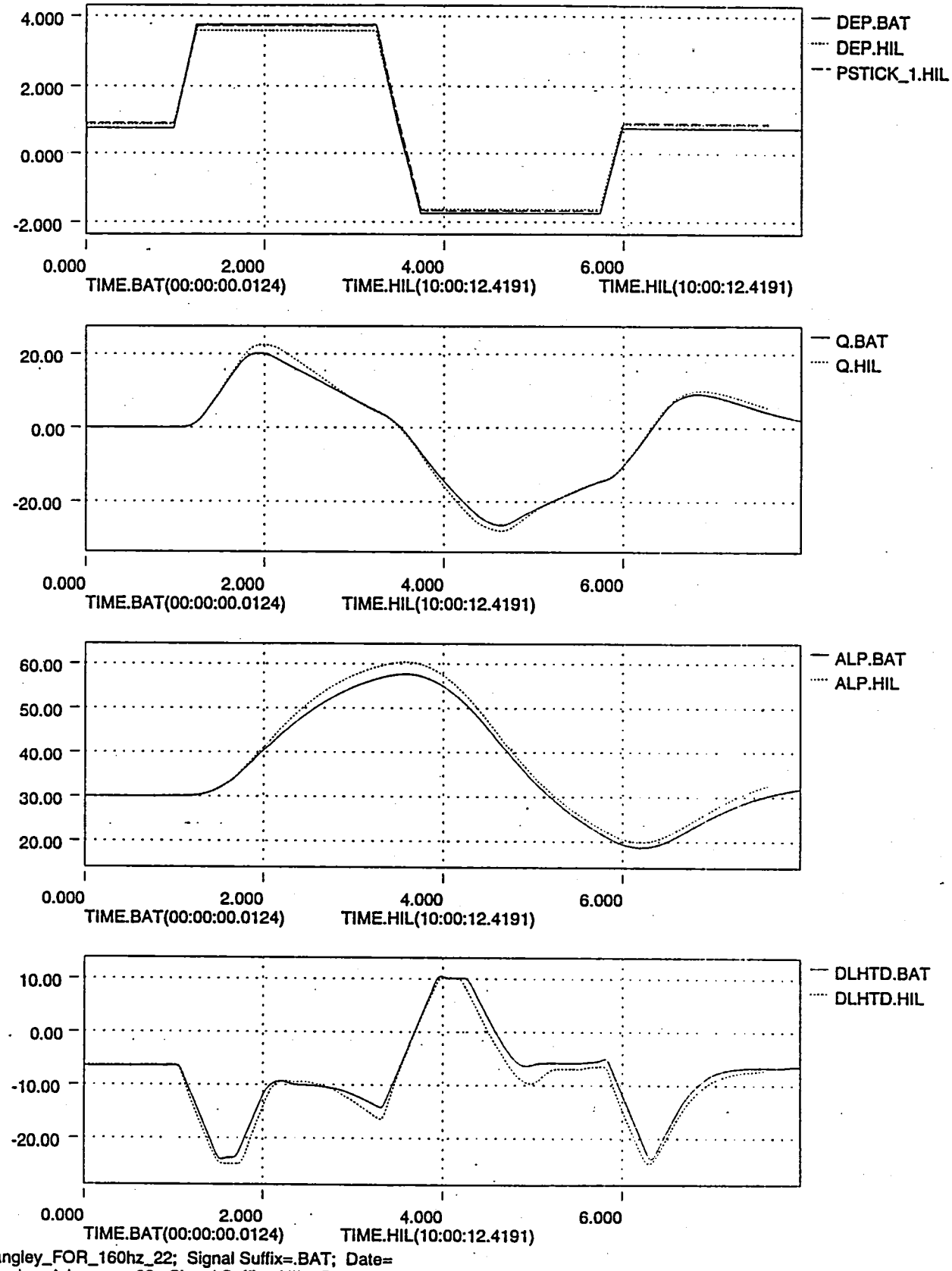

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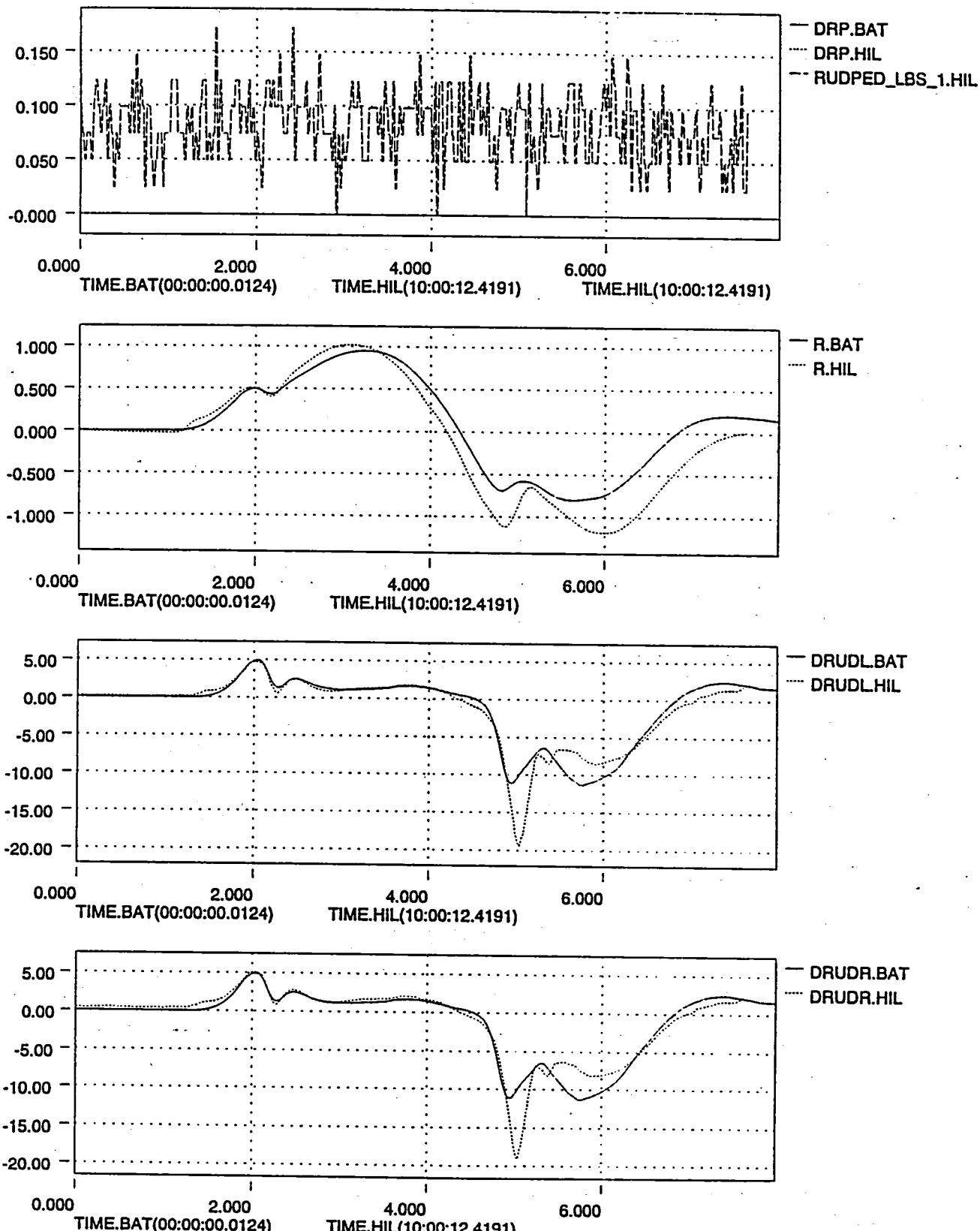
Figure 1 (Cont'd) - HIL Issue 2



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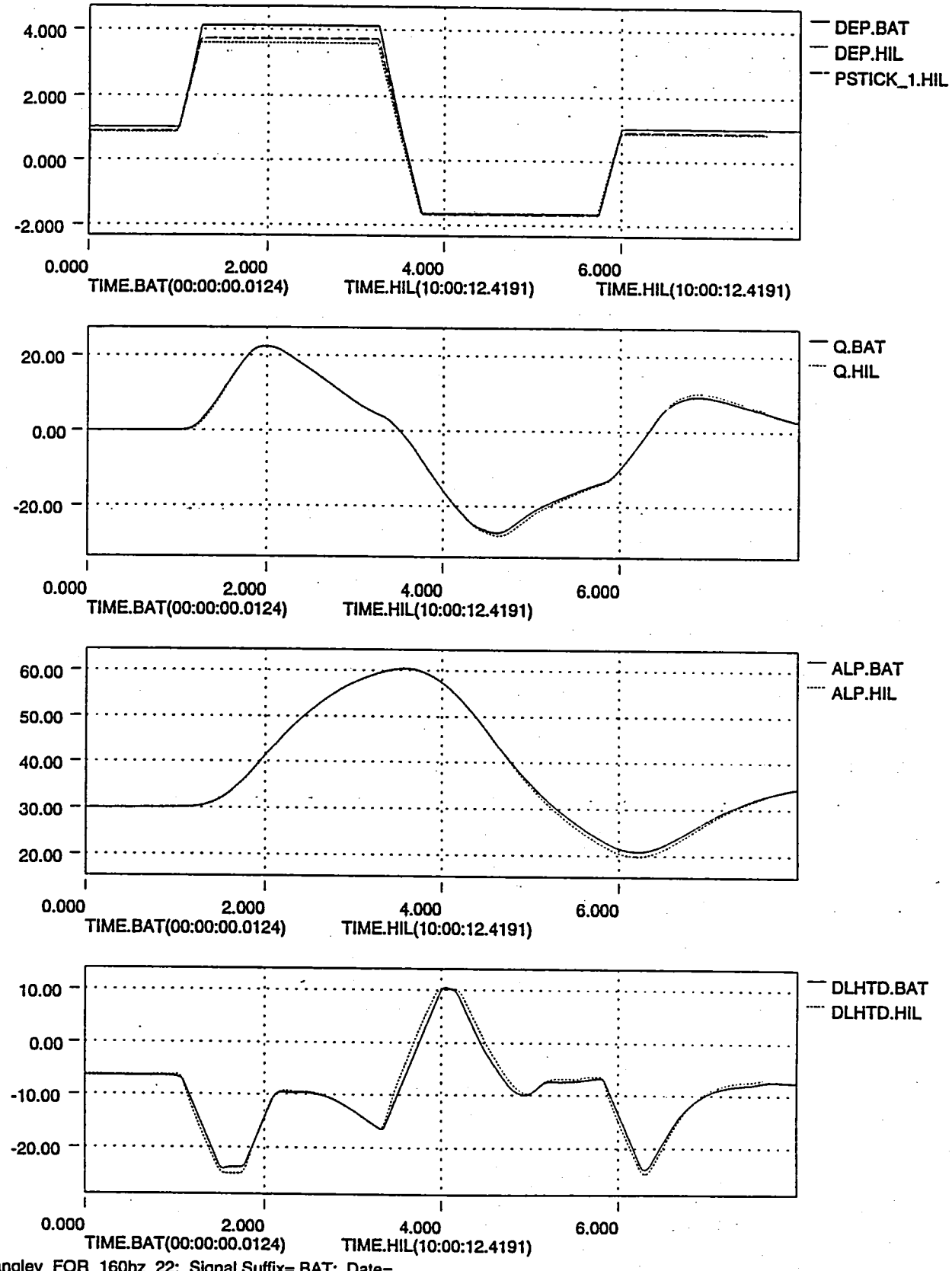
File=dryden_Ada_case_22; Signal Suffix=.HIL; Date=

Figure 2- HIL Issue 2

CASE_22__S_Mode__30alp-35k_Max_AB_2_in_ramp_dep page 1/12

Thu Mar 2 16:28:34 1995



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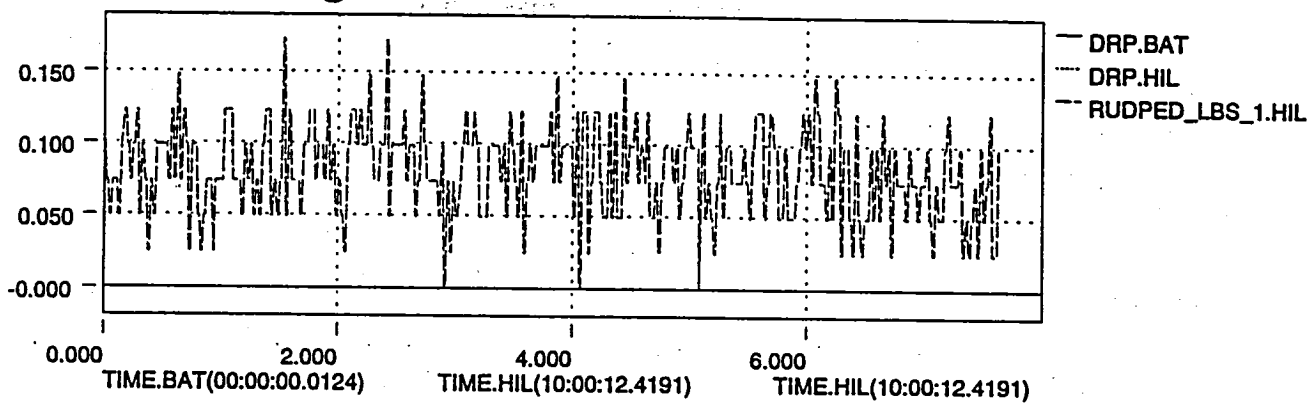
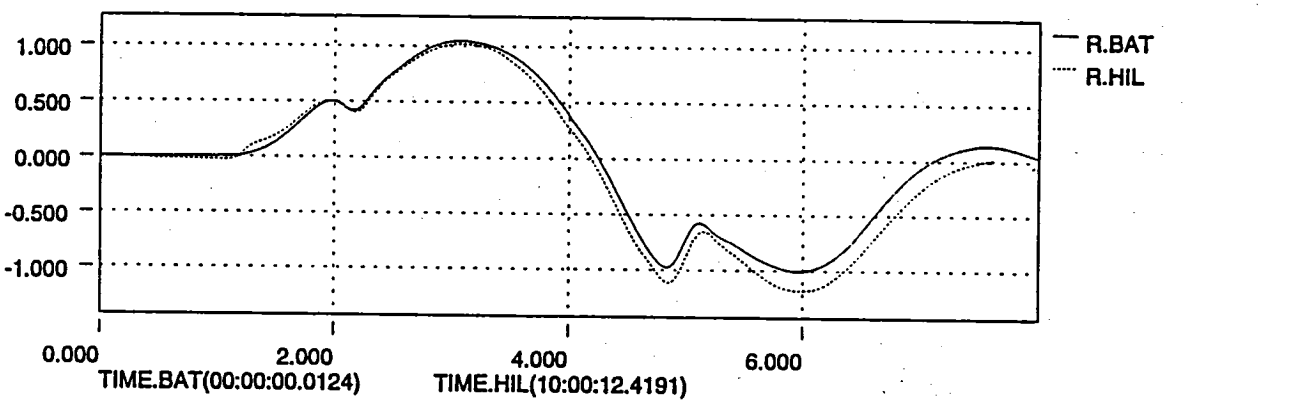
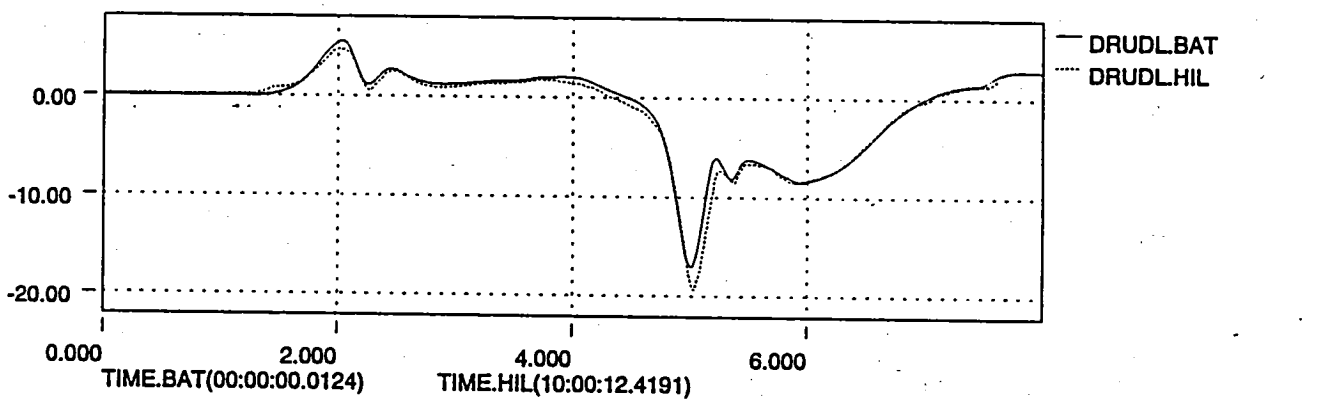
Ny Delayed 4 Frames & Qc Adjusted

Thu Mar 2 16:28:40 1995

Figure 2 (Cont'd) - HIL Issue 2







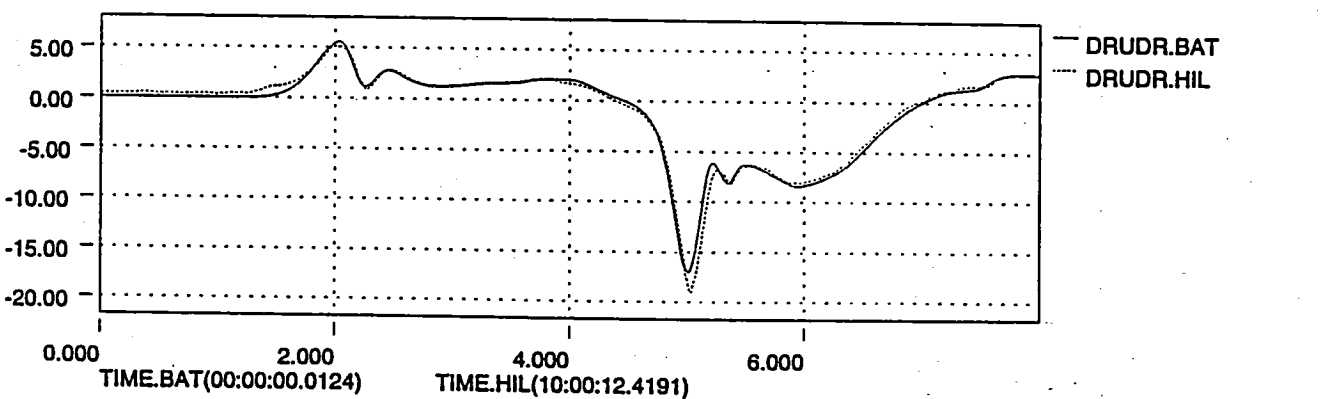


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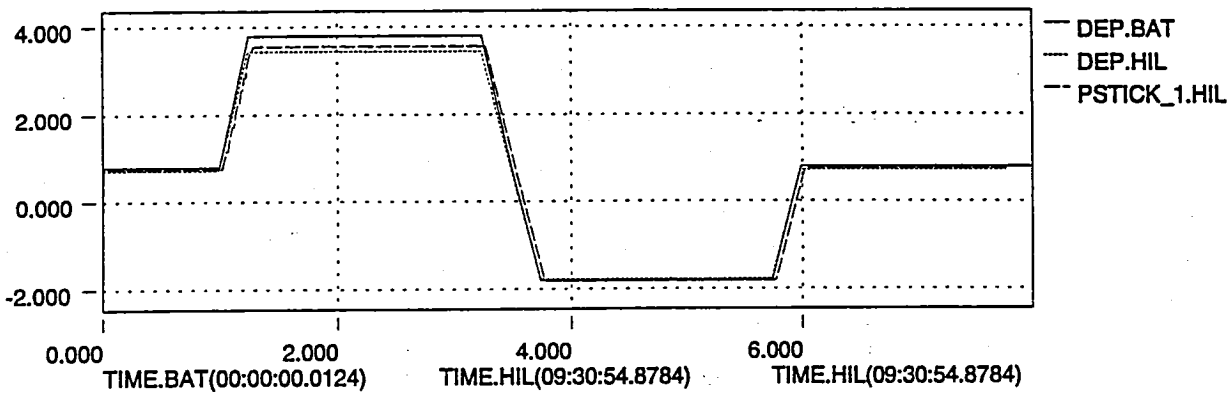
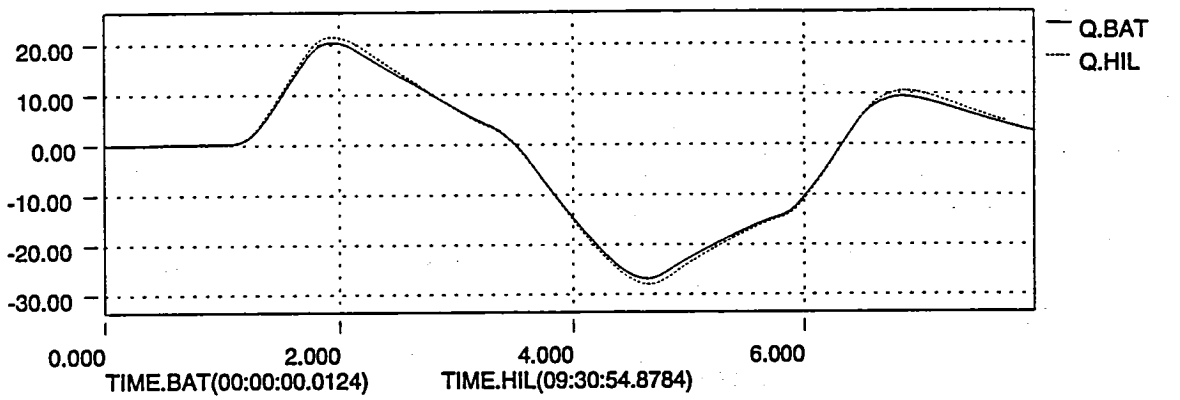
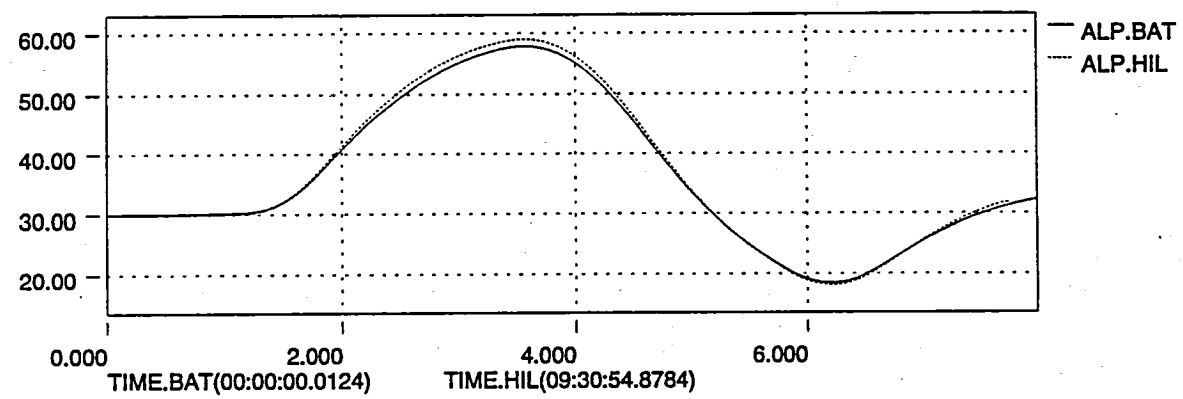
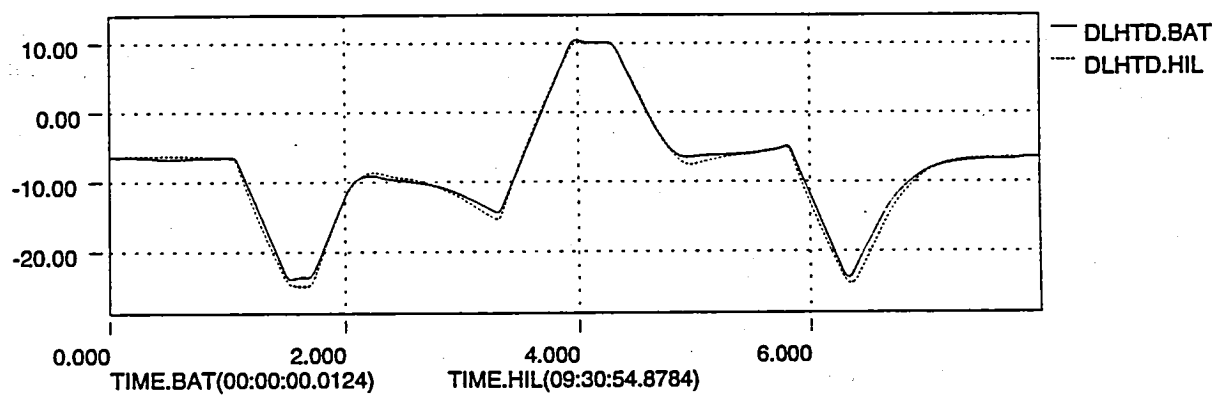
Figure 3 - HIL Issue 2, Qc Adjusted in Batch run to match HIL
CASE_22__S_Mode__30alp-35k_Max_AB_2_in_ramp_dep page 1/2









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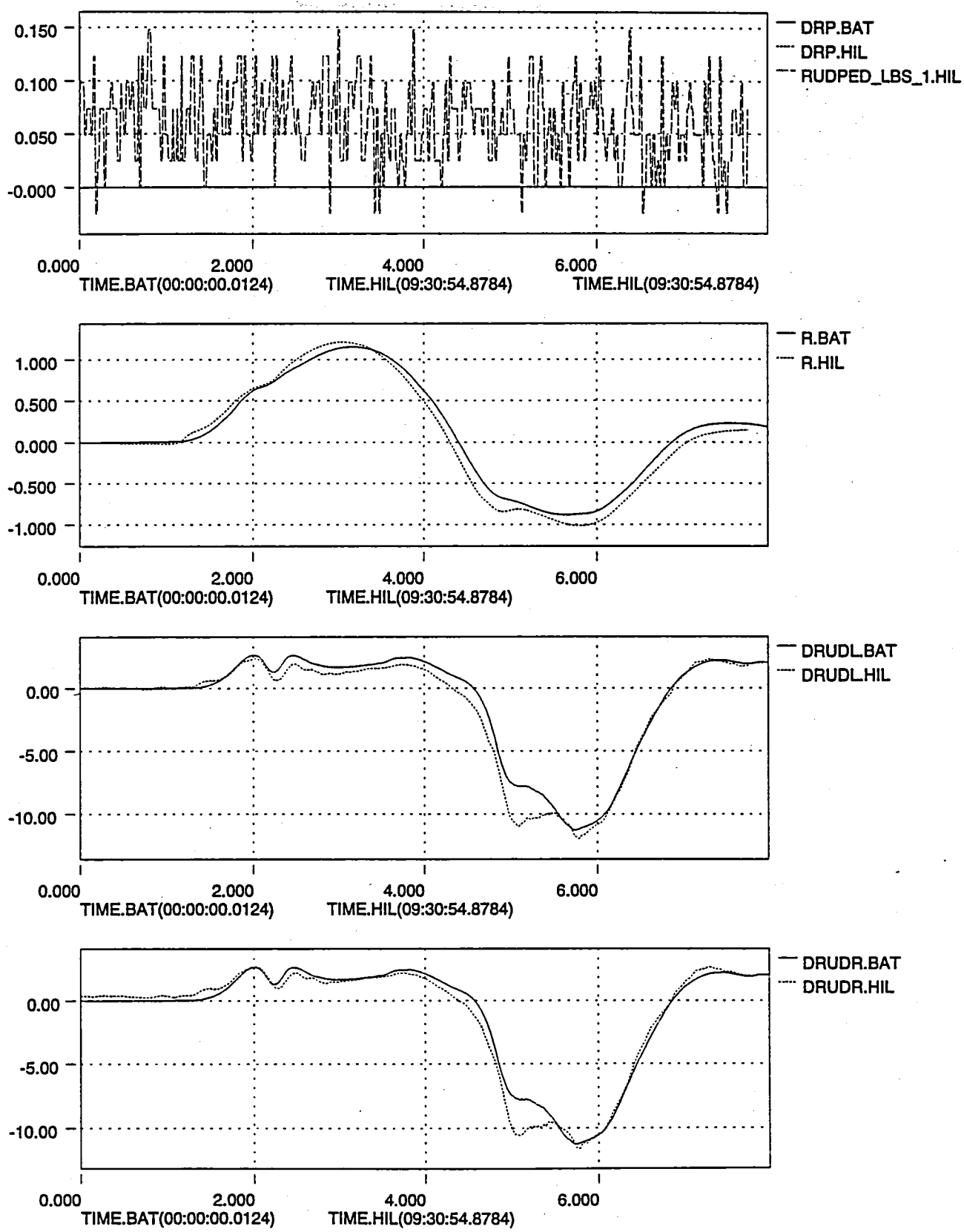
File=dryden_Ada_case_22; Signal Suffix=.HIL; Date=

Figure 3 (Cont'd) - HIL Issue 2, Qc adjusted in Batch run to match HIL
CASE_22__S_Mode__30alp-35k_Max_AB_2_in_ramp_dep page 1/2



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3 - Lateral Stick Command Rate Limit.

During testing of the lateral/directional sensitivity discussed in HIL issues 1 and 2, lateral stick step inputs were run and compared between the batch and HIL simulations. The ANSER performance validation test plan did not include any lateral stick step inputs in an attempt to minimize the effect of the lateral stick signal selection logic. The step lateral stick time history results showed discrepancies that were attributed to the lateral stick command rate limit which was modified in CCR 766. The Ada code was not originally modified for this CCR change and thereby resulted in the difference between batch and HIL. An Ada coding change was made to reflect the current ANSER spec and resolved this issue.

5 - 20 Hz Buzz in Strake Commands.

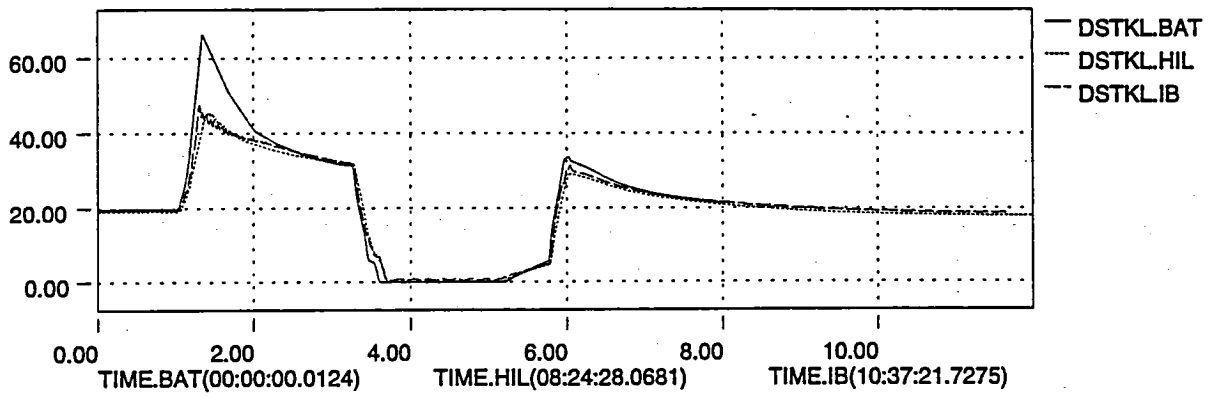
One interesting observation made in a batch versus HIL versus IB checkcase received from DFRC was a 20 Hz oscillation noticed in the left and right strake deflections. (See Figure 1). The batch time history was rerun using the recorded signal selection (SS) logic output as the lateral stick input into the batch simulation. Figure 2, plot 1, shows the lateral stick (DAP) from the original batch simulation time history. Also shown is the batch simulation run using the HIL SS lateral stick (HIL_STK) and the HIL run itself labeled LAT_STICK_IN_1.HILB. The internal lateral stick input (LAT_STICK) is shown on plot 2. The lateral stick command (LATST_CMD) is shown on plot 3 with an enlargement shown on plot 4. The original batch run shows a flat, "smooth", lateral stick command where as the batch run using the HIL SS lateral stick shows a 20 Hz oscillation.

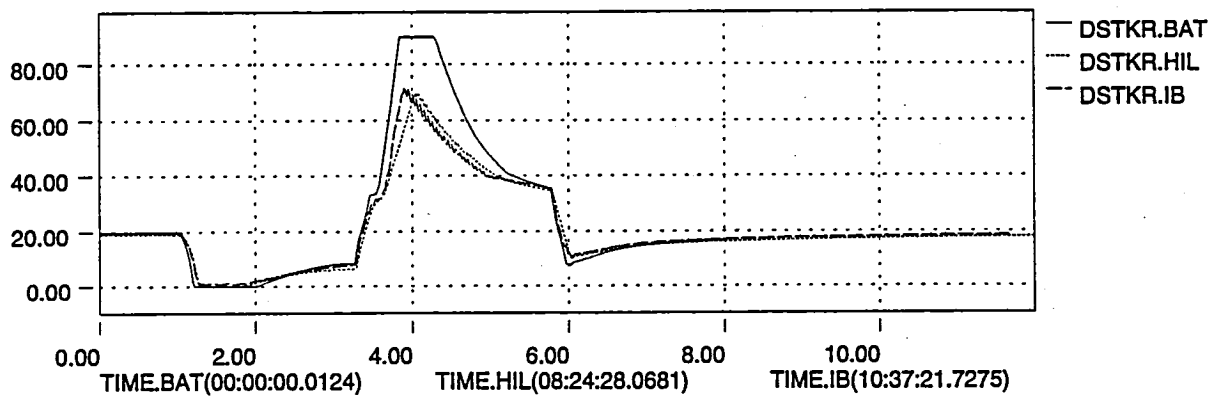
Figure 3, plot 1 and 2 show that virtual roll command (VROLL) for the ANSER lateral/directional control laws with the same 20 Hz oscillation caused from LATST_CMD. Plots 3 and 4 shows the left strake command which as a result of VROLL, produces the same 20 Hz oscillation.

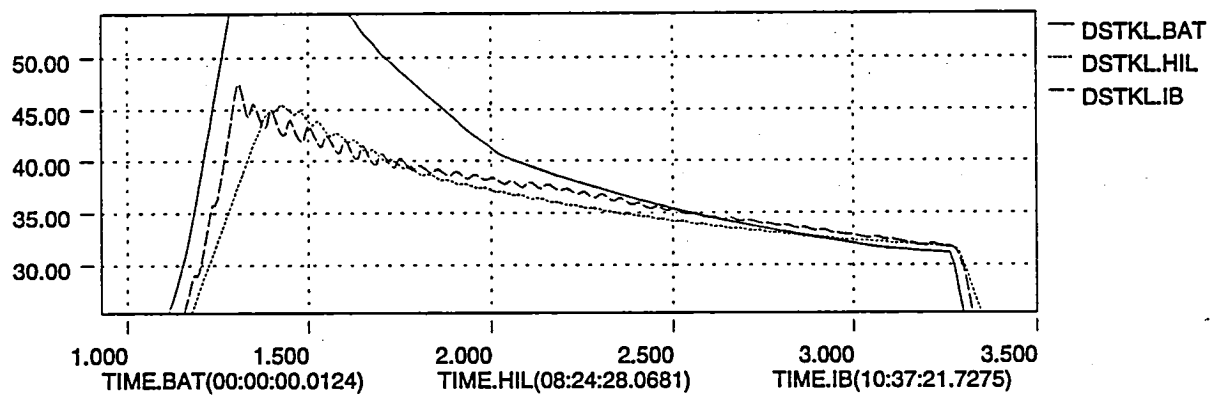
Figure 4 shows flight test results of the lateral stick on plot 2, and the lateral stick command on plot 3. The same 20 Hz oscillation appears on the flight test results. The conclusion for this issue was that the 20 Hz buzz results from the signal selection logic output and is not attributed to a problem in the ANSER control system.

Figure 1- H/L Issue 5

Thu Feb 9 13:15:56 1995







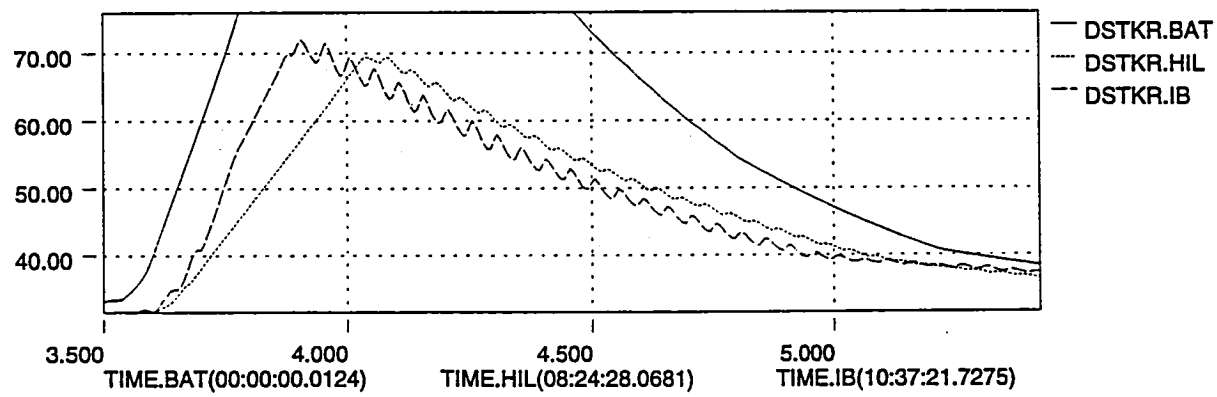


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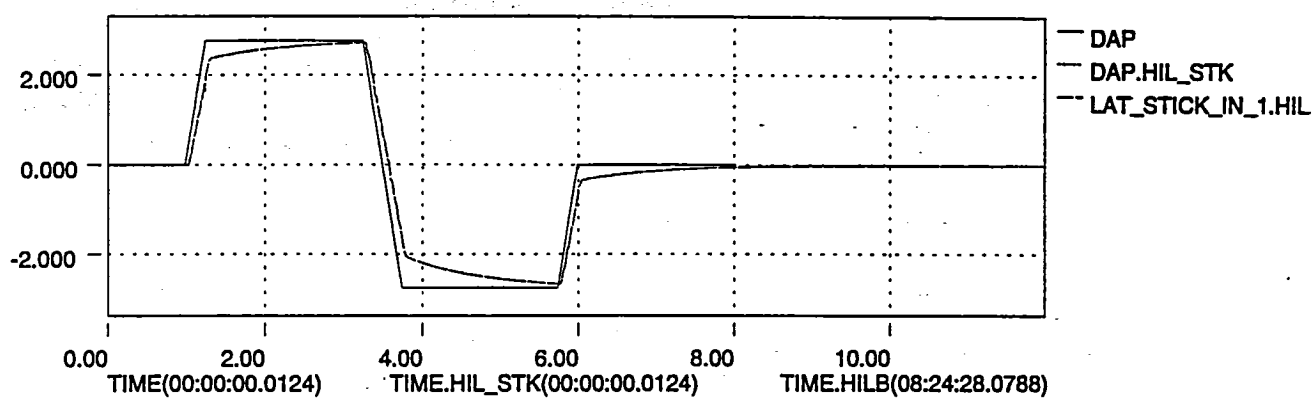
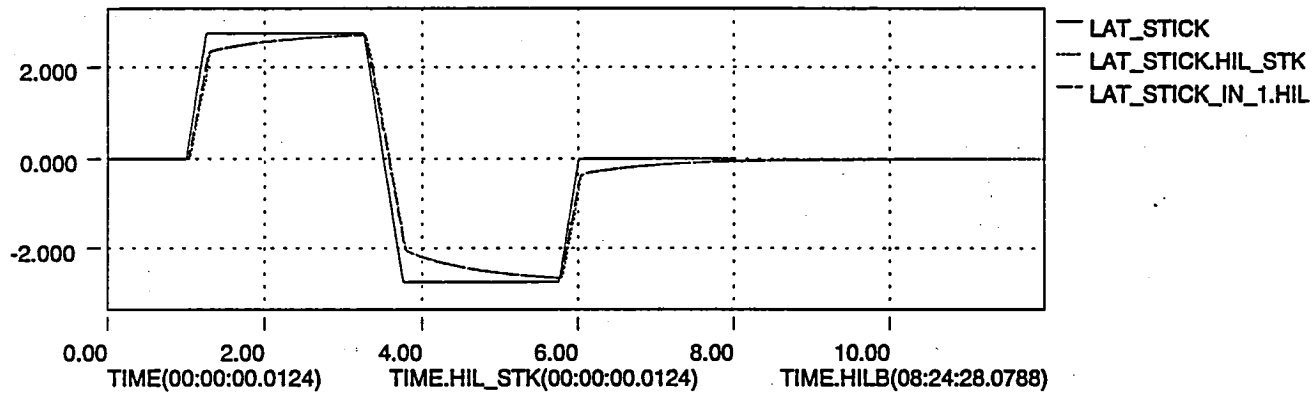
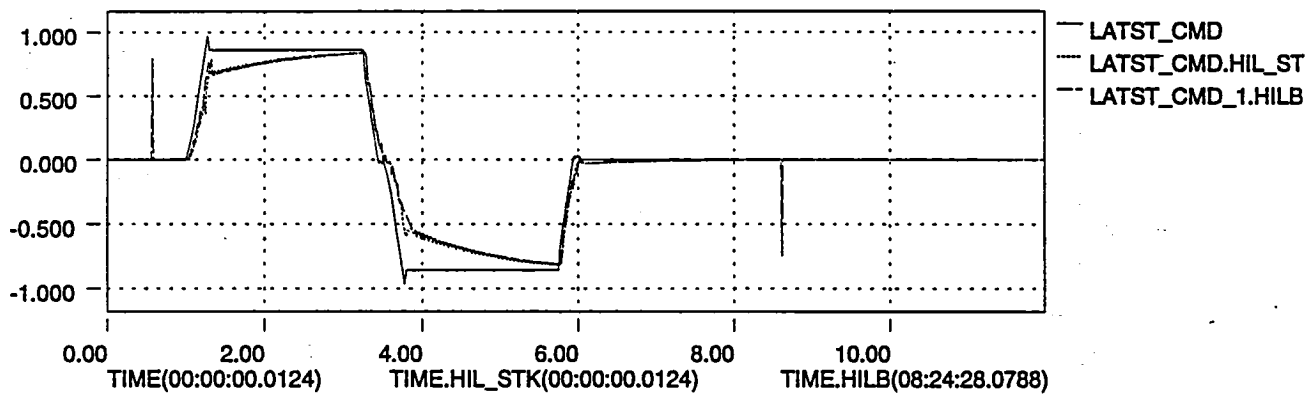
Figure 2- HIL Issue 5

Thu Feb 9 09:24:05 1995







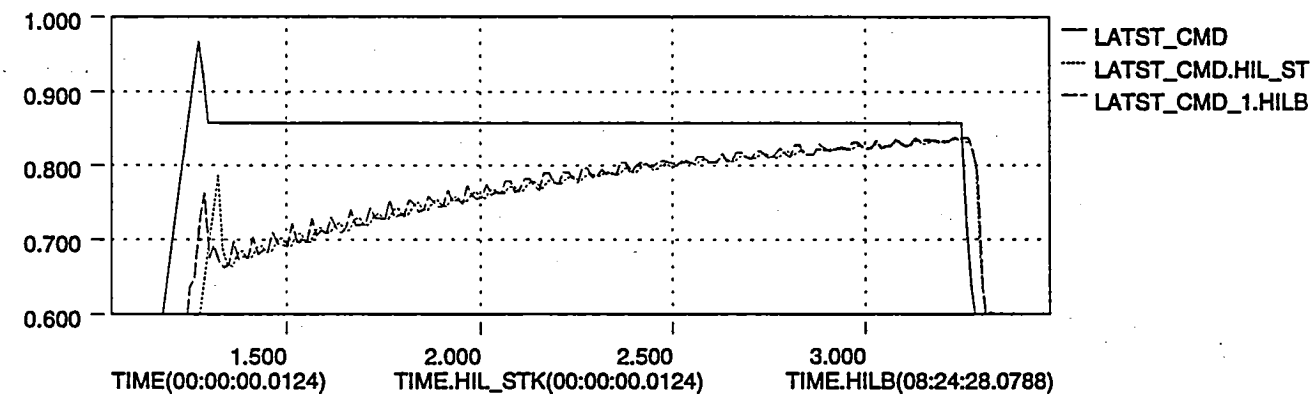


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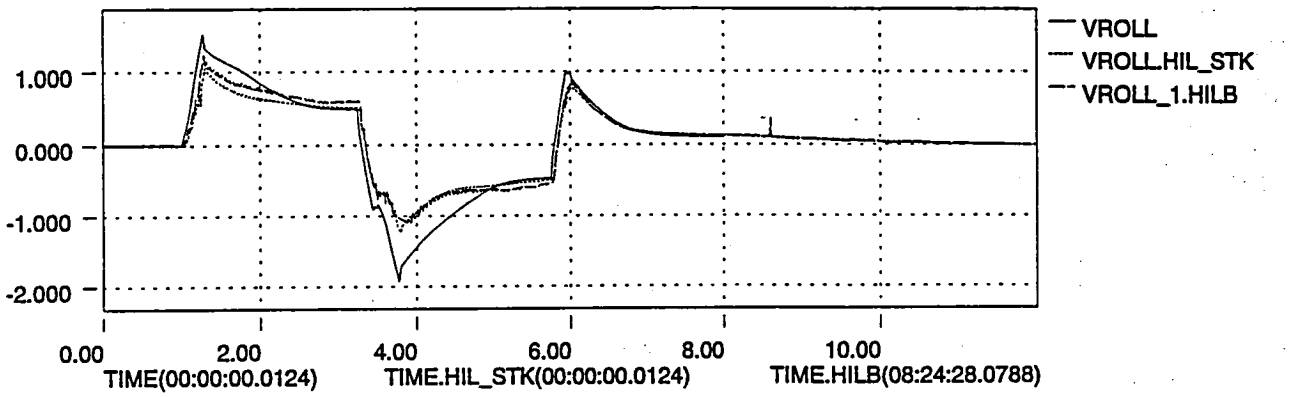
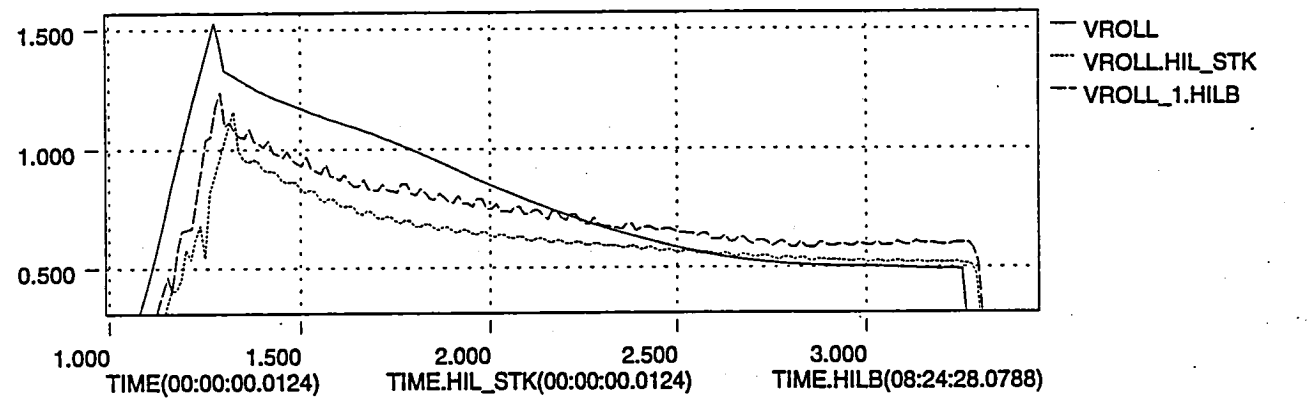
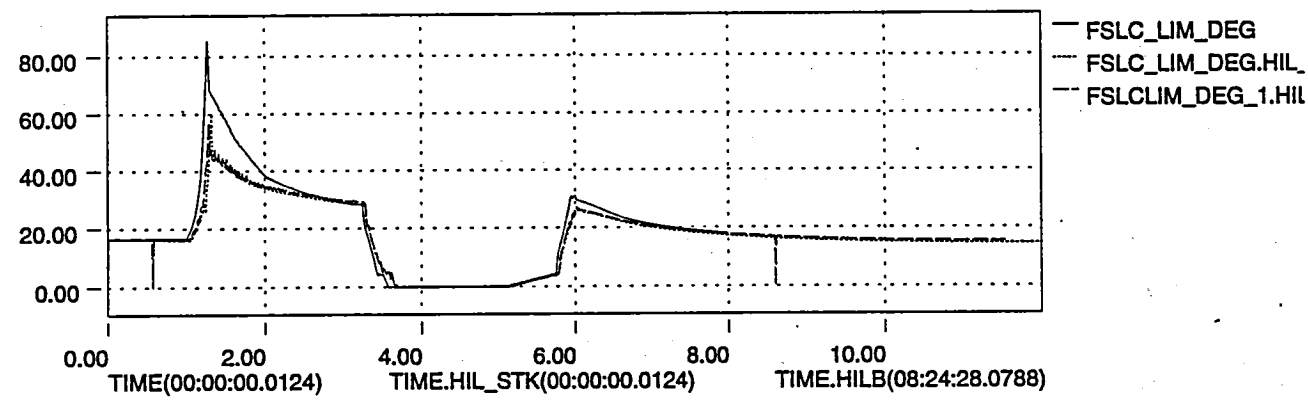
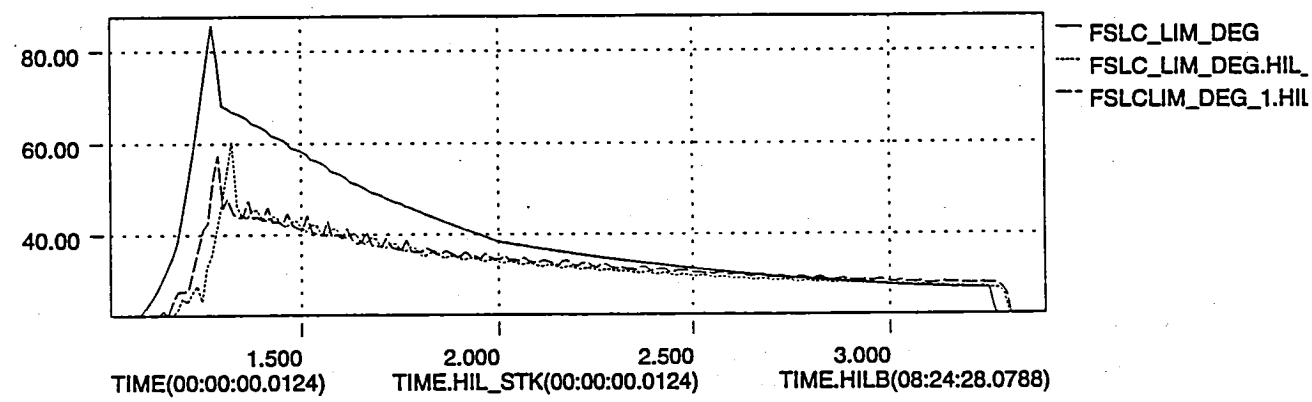
Figure 3 - HIL Issue 5

Thu Feb 9 09:26:57 1995









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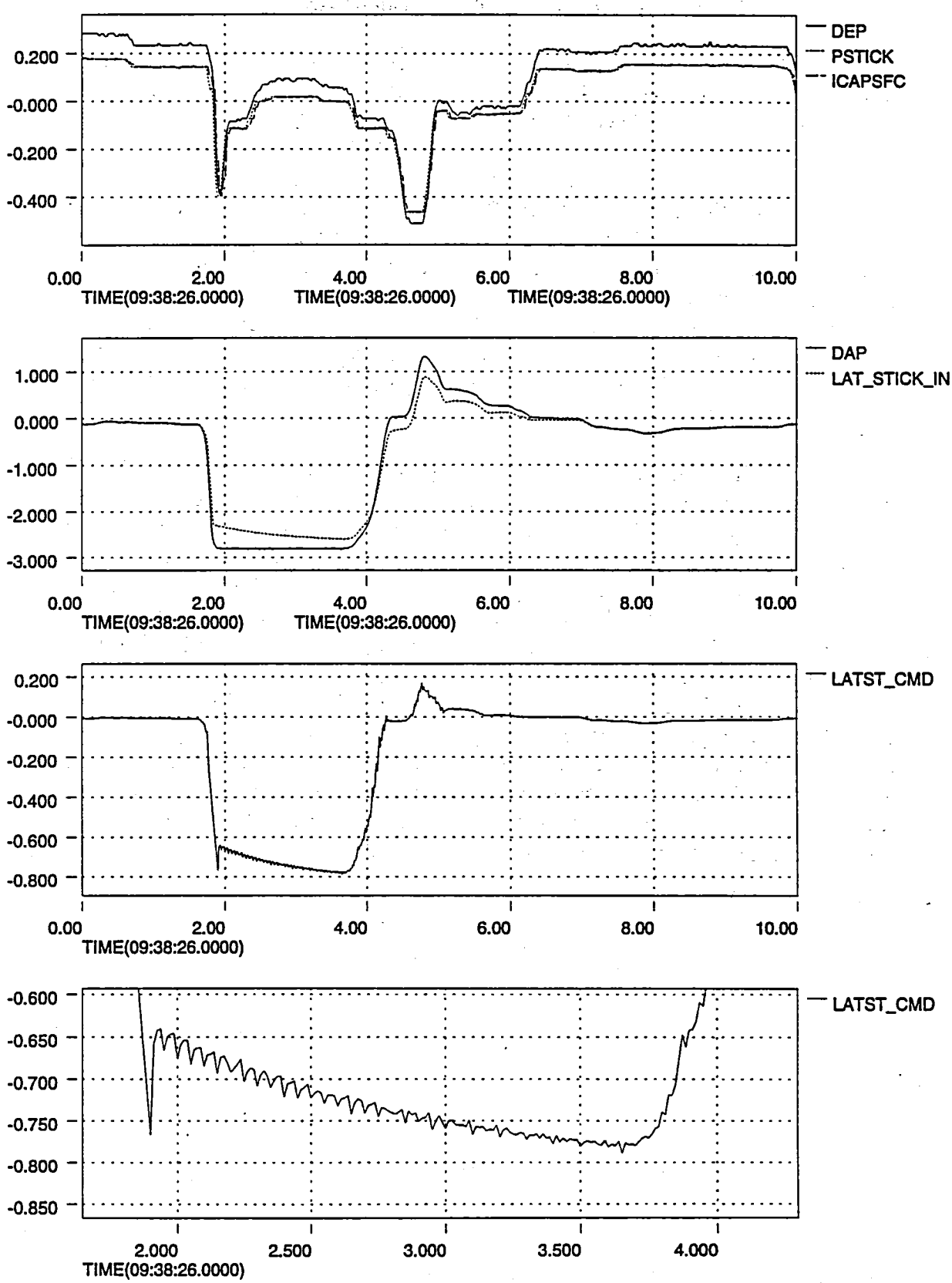
Fri May 5 09:36:06 1995

Figure 4 - HIL Issue 5



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6 - Pitch Command Limit.

During study of checkcase 28 which included a 5 inch longitudinal step input it was noted that the total pitch stick command, labeled PSGTOT internally in the ANSER longitudinal control system, could exceed 5 inches which is the aft position limit on the longitudinal stick. This was due to the fact that a gain of 1.1 was added to the longitudinal stick input for positive (aft) deflections only into the ANSER longitudinal control system. The gain was developed as a result of NASA-1A flight data analysis which showed that the aft longitudinal stick input would never exceed 4.5 inches as a result of the signal selection logic. Therefore to recover the 10% loss in aft longitudinal stick commands a gain was applied to the input and included in the ANSER control system modifications in CCR 766.

Since the HIL uses the actual flight Ada load to run the ANSER control laws, the 1.1 gain is included in all HIL runs. To remove this effect, the longitudinal stick inputs were scaled in the HIL scripts by dividing by 1.1. Therefore when a longitudinal input of 4.5 inches was requested, a 5.0 inch input would result as the commanded input. But HIL simulation runs resulted in outputs from the longitudinal signal selection logic which exceeded 4.5 inches. Therefore, the total longitudinal stick command exceeded 5 inches. It was also realized that a longitudinal stick input during the same time OBES is engaged and inputting a longitudinal stick input could exceed 5 inches of stick command. As a result of these observations a limit of -2.5 inches forward and 5.0 inches aft was applied to the total longitudinal stick command, PSGTOT, to prevent an excessive command from occuring. Reference CCR 791.

7 - Pitch Stick in HIL.

As noted under the discussion of HIL issue 6 a gain of 1.1 is included on aft longitudinal stick inputs. This was accounted for in HIL scripts but cannot be easily accounted for in piloted HIL simulations. Therefore all piloted HIL simulations contain aft pitch stick inputs that are 10% greater than will be achieved in flight.

8 - Strake Actuator Model (SAM).

Two separate strake actuator models exist and are implemented in batch and HIL simulations. The batch simulation model consists of a second-order transfer function and contains a hinge-moment model. The HIL SAM utilizes both hardware components and software code written in C language. No hinge-moment model is included in the HIL SAM. An option was added to the batch simulation and set in all batch scripts to turn OFF the strake hinge-moment model effects. Frequency response comparisons between the HIL SAM and the IB, which includes the actual nose strake actuators, were made and showed good agreement. Performance validation checkcases which utilize the strakes shows differences between the batch and HIL strake-deflection rate limits. These differences were traced to the SAM implementation which contains different main RAM piston areas, RAM slew rate limits, spoon position limits, and overall loop gain. The SAM values were a result of work performed to match the strake actuators on the IB. A summary of the differences between batch and HIL SAM are listed below.

Simulation	Spool Position Limit	Slew Rate Limit	Main Piston Area	Loop Gain
Batch	± 0.03	+13.1/-11.4	1.5406 (Extend) 1.2253 (Retract)	
HIL SAM	± 0.028	±13.5	6.09	2.3

In terms of ANSER performance validation checkcase differences, the rate-limit differences are noticeable in the strake-deflection time histories, but the aircraft response differences due to these modeling differences was found to be small.

9 - Leading Edge Flap (LEF) Discrepancies.

Time history responses from the HIL showed strange results which seem to be due to recording but is not resolved and under investigation. The results were not repeatable and did occur from time to time on other time history parameters.

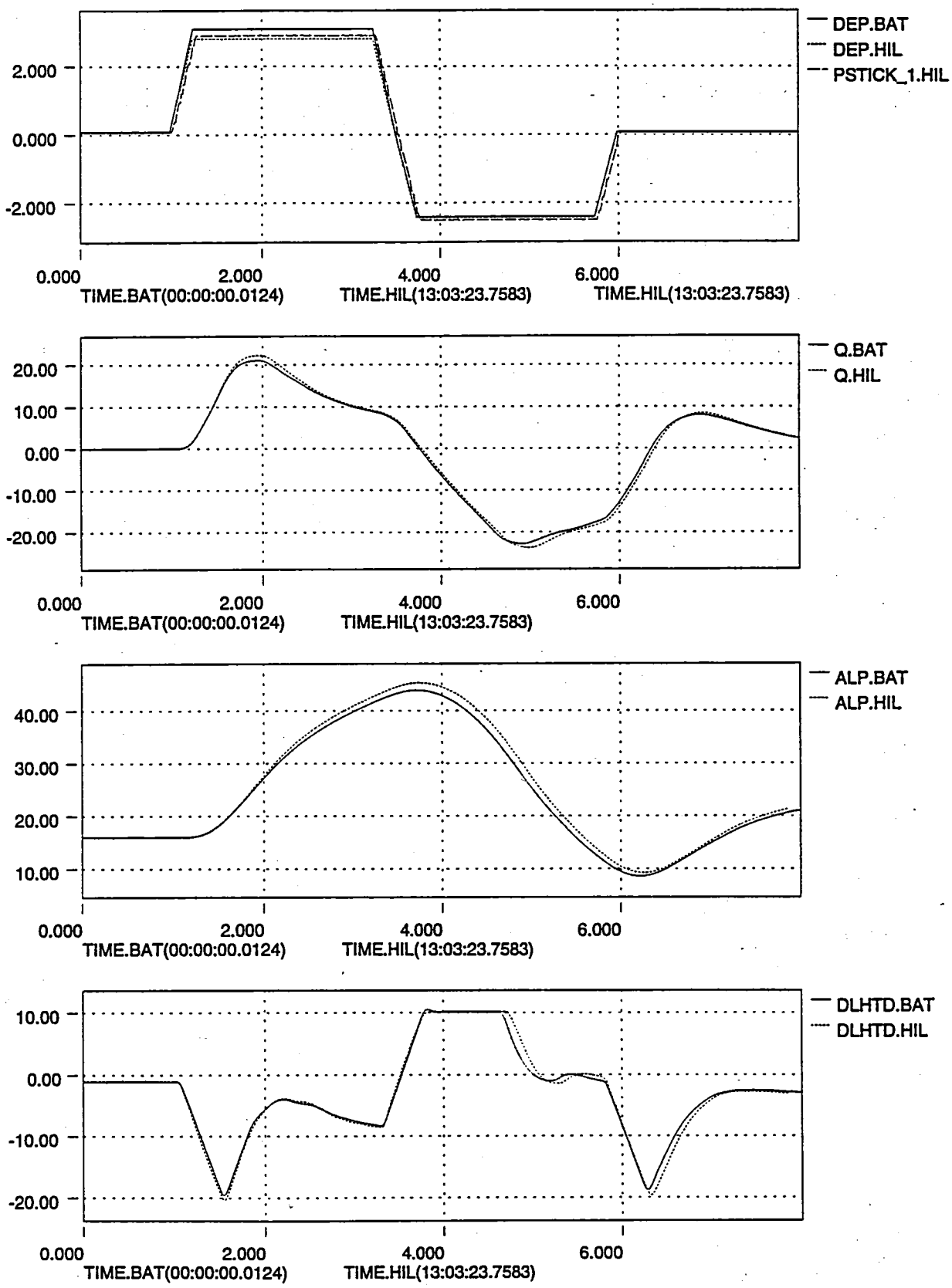
10 - Impact Pressure Differences between Batch and HIL.

Impact pressure differences between batch and HIL simulations were discovered during NASA-1A performance validation testing. The reason for this is due to the hardware scaling of the Airdata Computer signals which for impact pressure is 1% of the total range (~2000 psf). Therefore as AOA increases to 30 degrees, impact pressure decreases, and has been observed to be in error by as much 25%. Above 30 degrees AOA the source for impact pressure changes to the Mission Computer. Disagreements have been observed in this AOA region as well but to a much smaller percent. The impact pressure differences have the undesired effects of causing pitch trim stick to be calculated differently between batch and HIL simulations. Since the script inputs are added on top of the trim commands, differences in the time history throughout the simulation run results.

To demonstrate the effect of the impact pressure difference on the batch closed loop simulation response, the batch simulation calculation for impact pressure (QCI_SEL) was artificially increased by 17.7 psf to more closely resemble the difference noted in checkcase 1. (Reference checkcase 1, page 6 of 12 in Appendix B) The resultant time history comparison is presented in Figure 1. A better match in pitch trim position (DEP) is obtained which results in all batch versus HIL time history comparisons showing better agreement.

The impact pressure differences have a similar effect on all of the ANSER performance validation checkcases in Appendix B which trim below 30 degrees AOA.

Figure 1 - HIL Issue 10 - Impact Pressure Differences
CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 1/12



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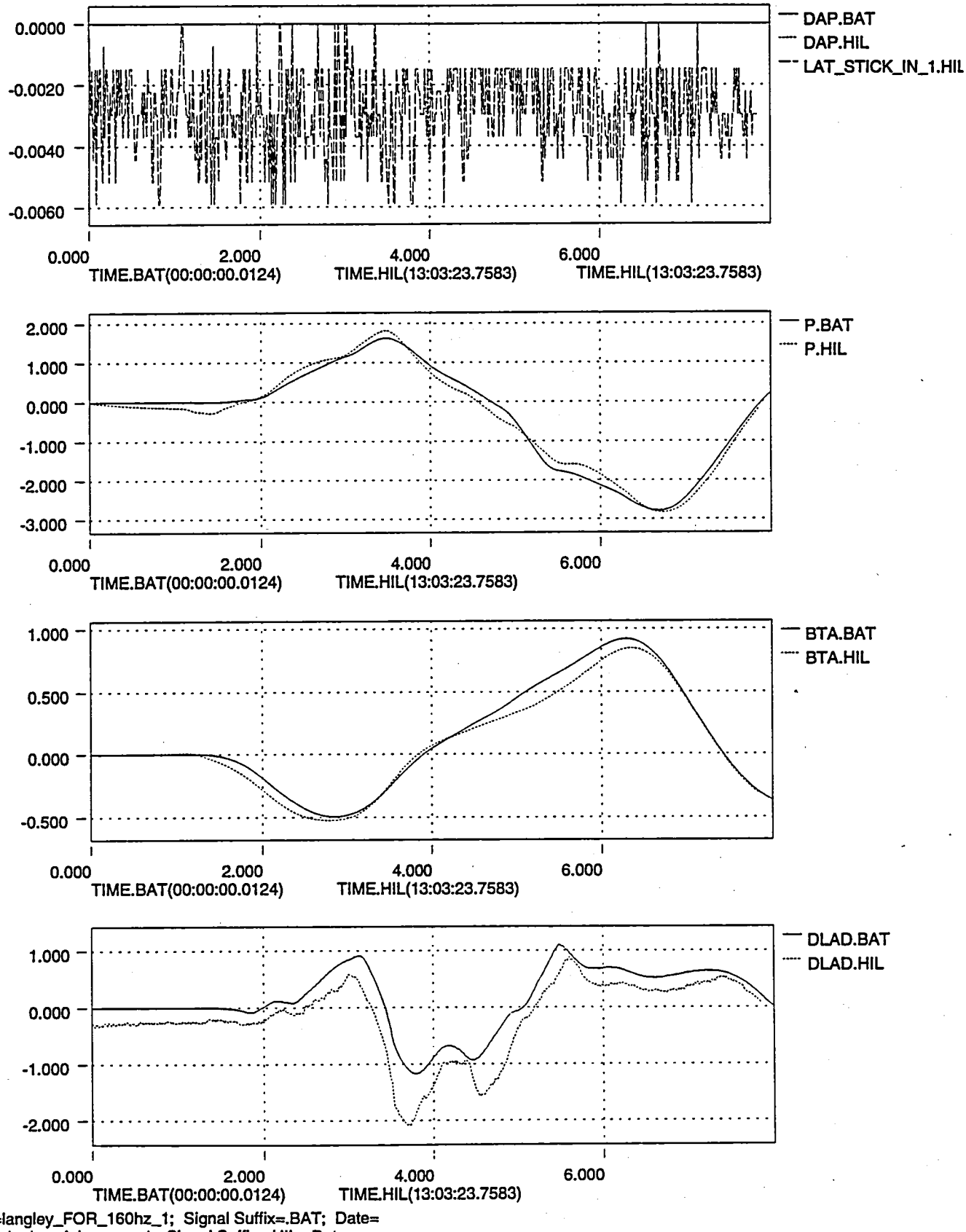
CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 2/12



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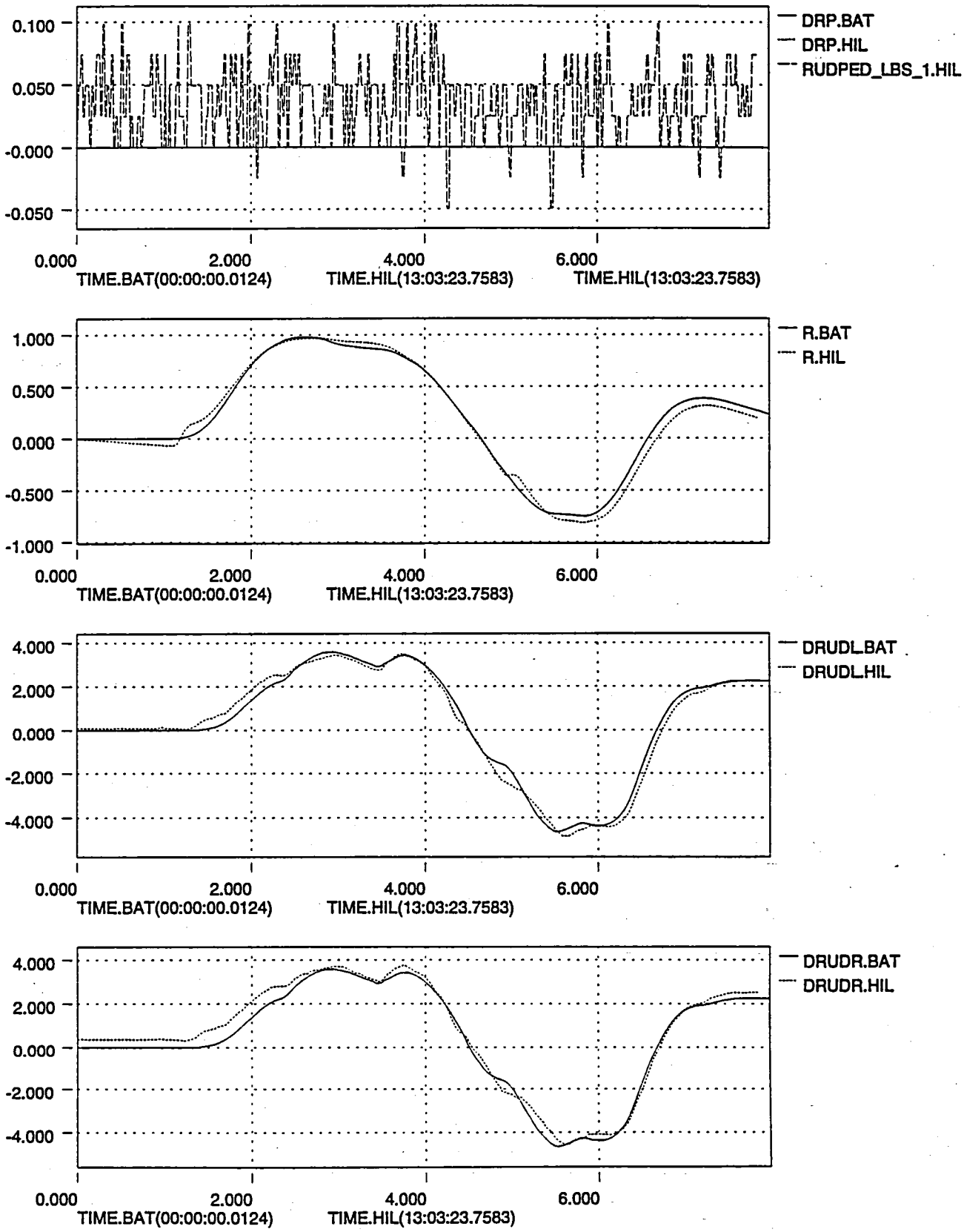
CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 3/12



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CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 4/12

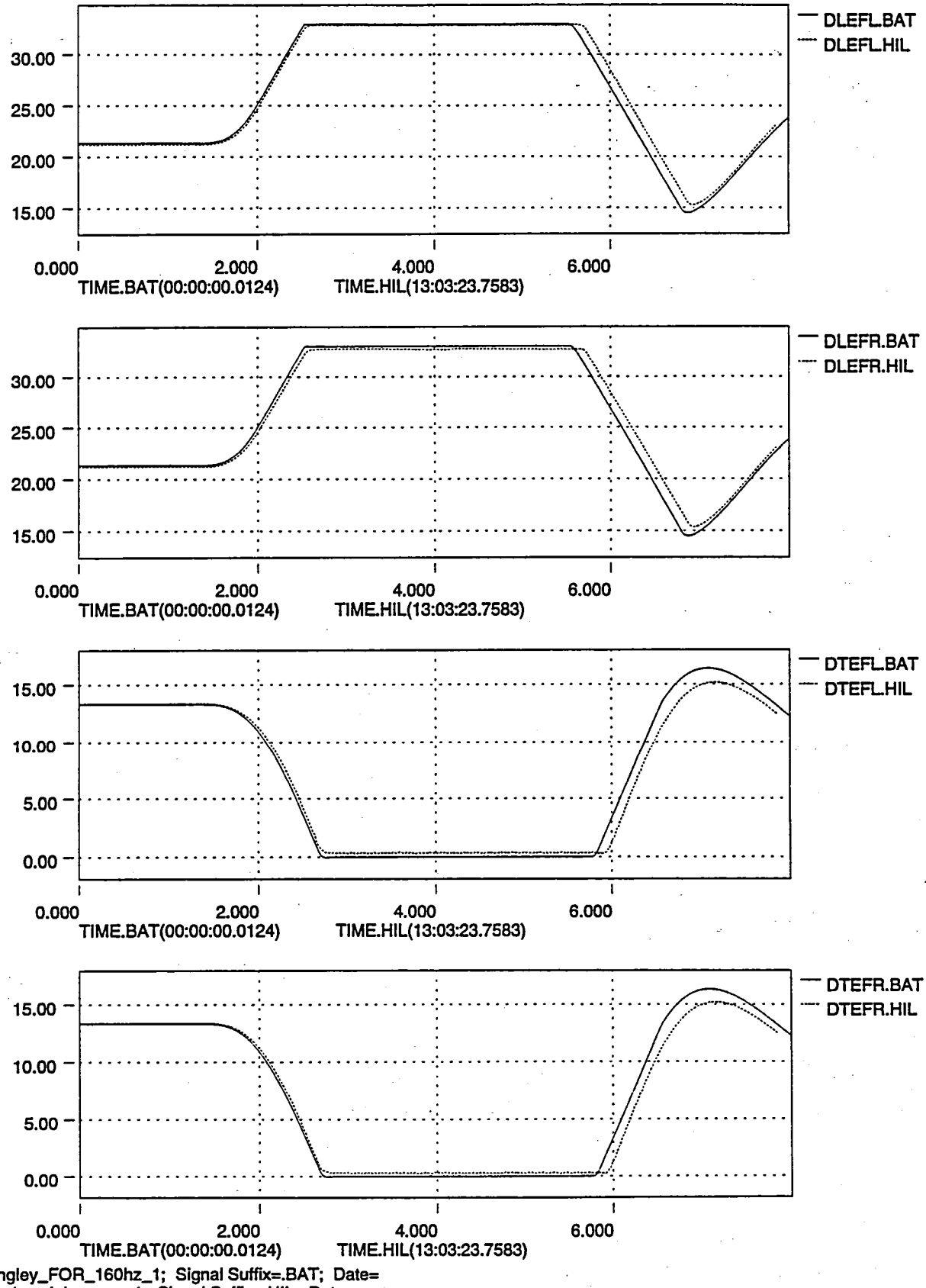

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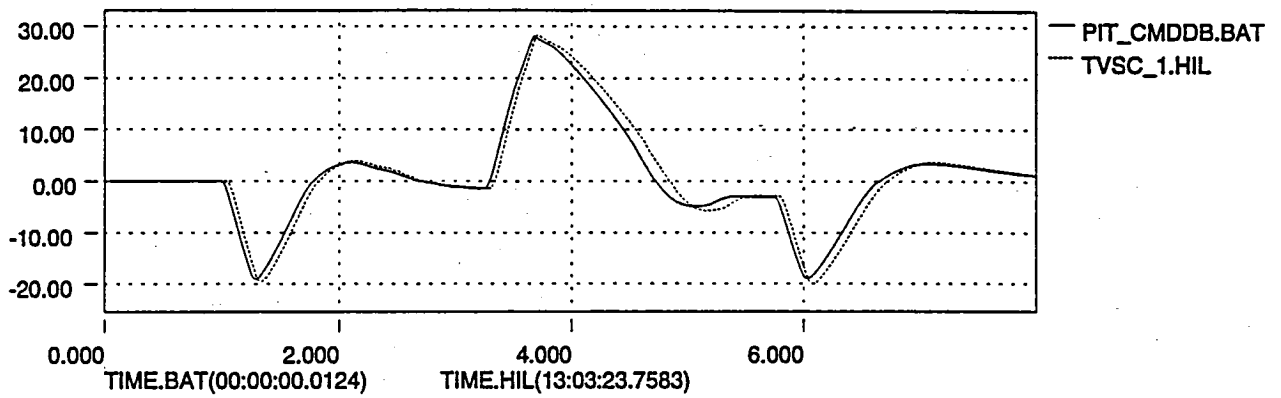
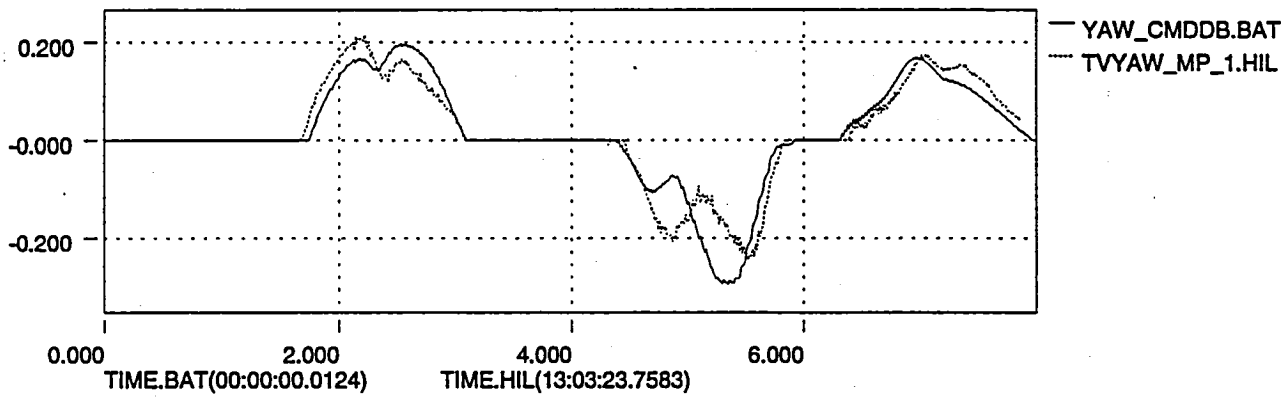
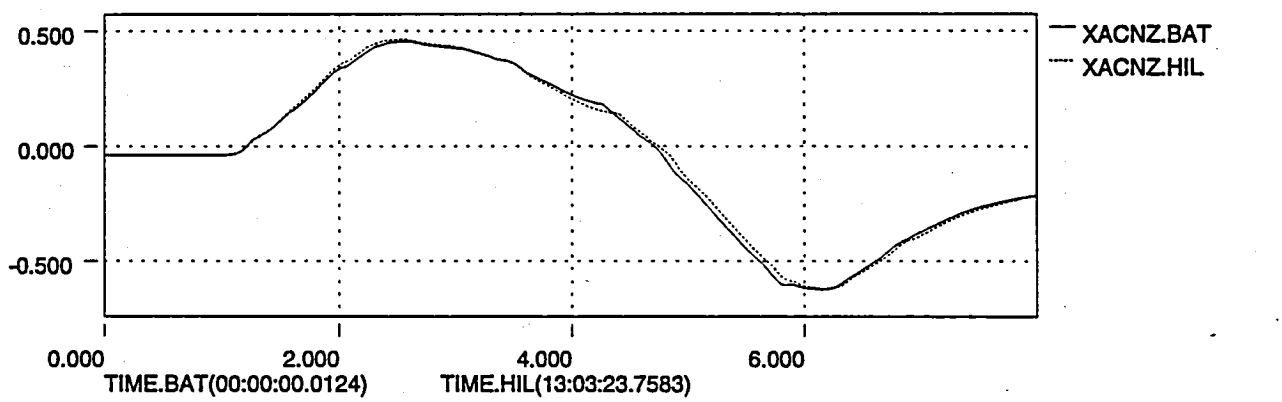
Figure 1 (Cont'd) - HIL Issue 10 - Impact Pressure Differences
CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 5/12







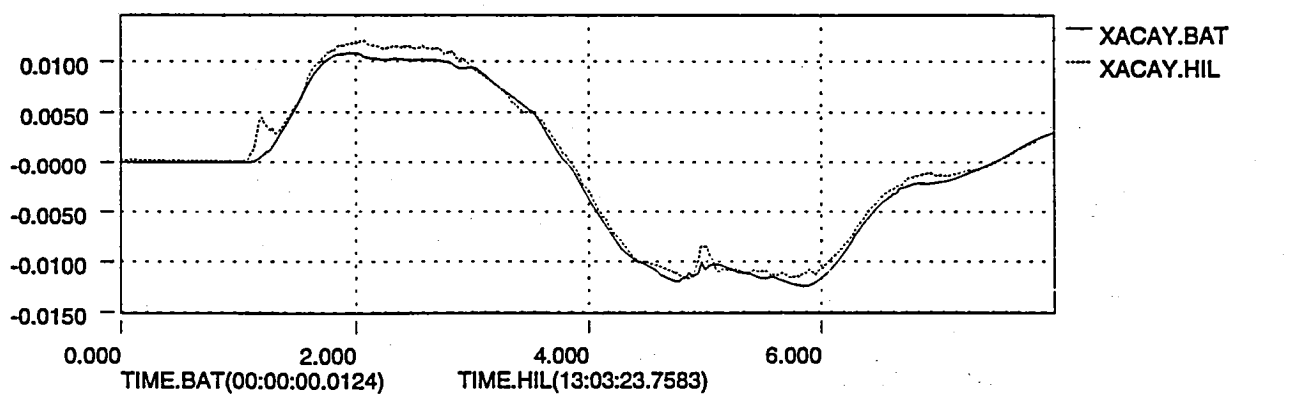


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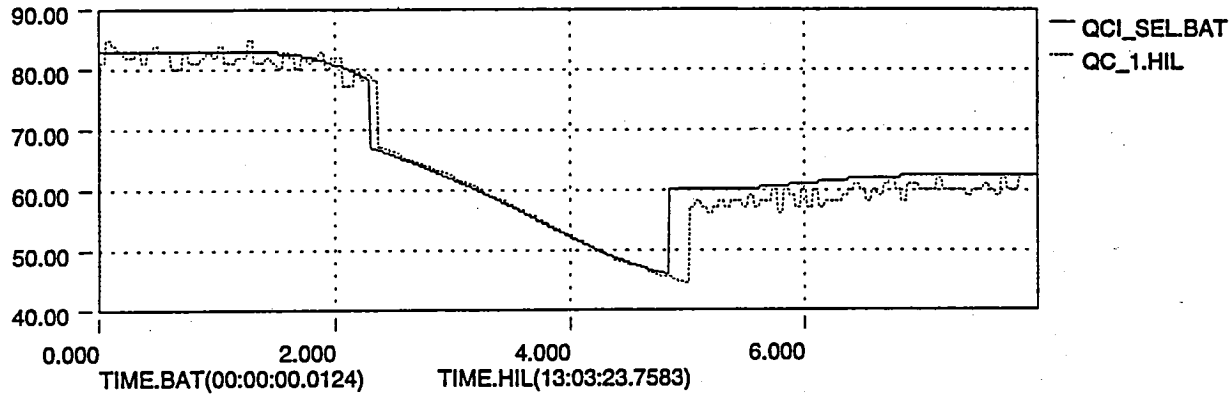
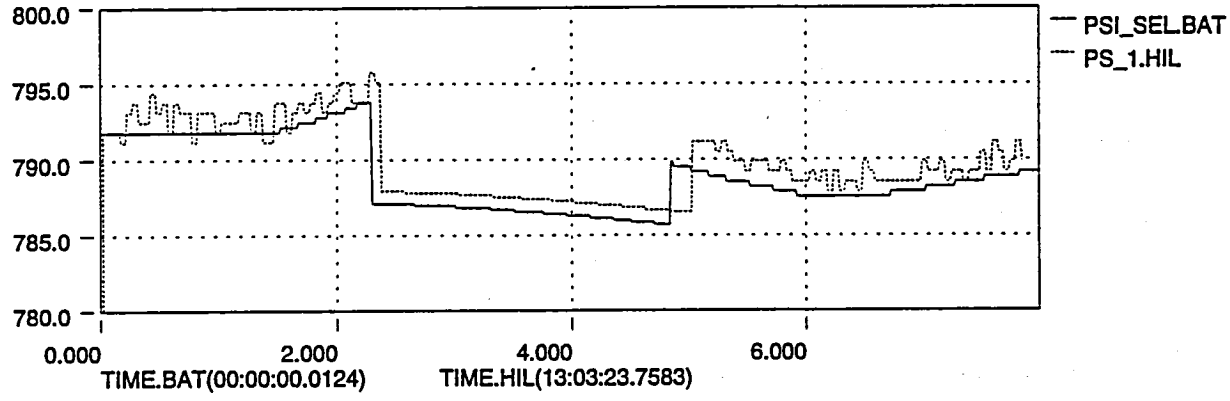
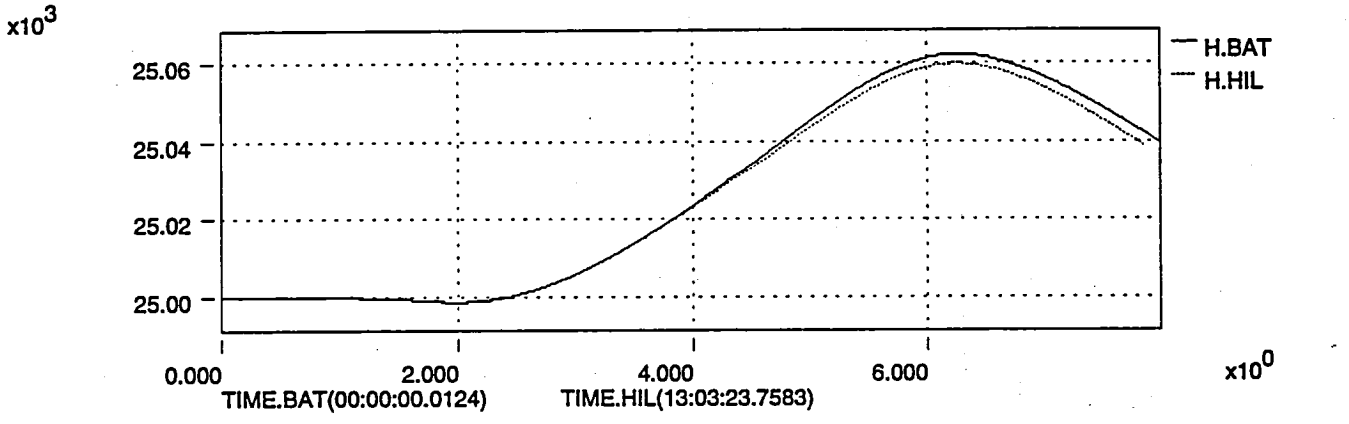
Figure 1 (Cont'd) - HIL Issue 10 - Impact Pressure Differences
CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 6/12







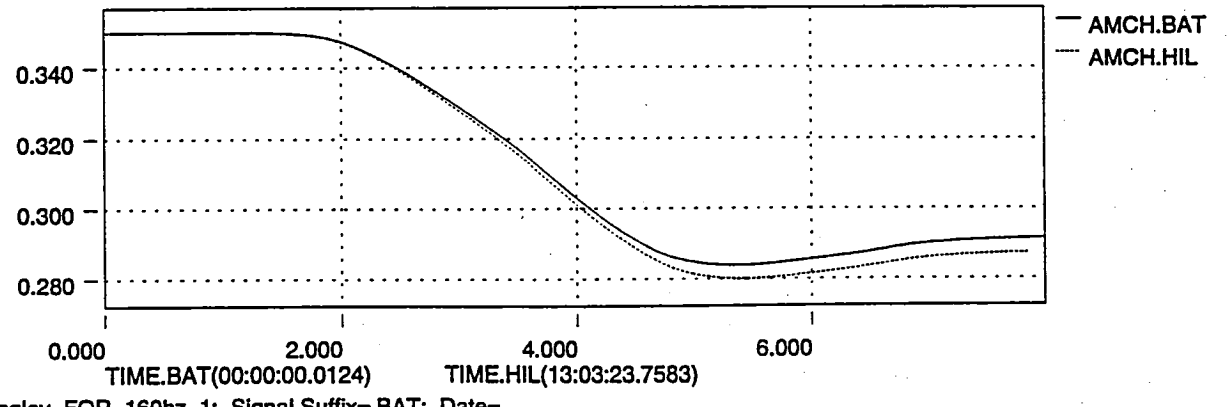


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Figure 1 (Cont'd) - HIL Issue 10 - Impact Pressure Differences
CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 7/12

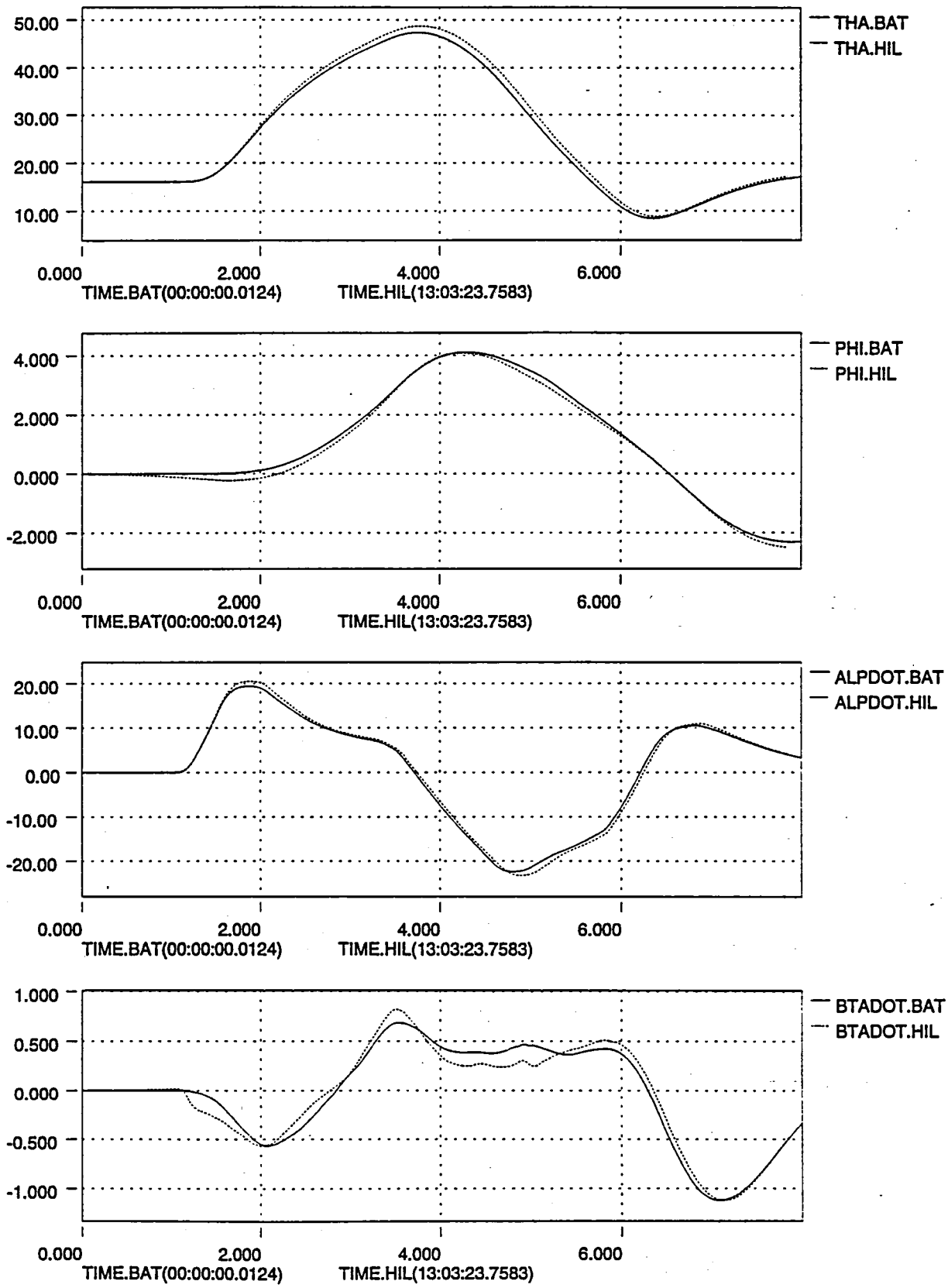

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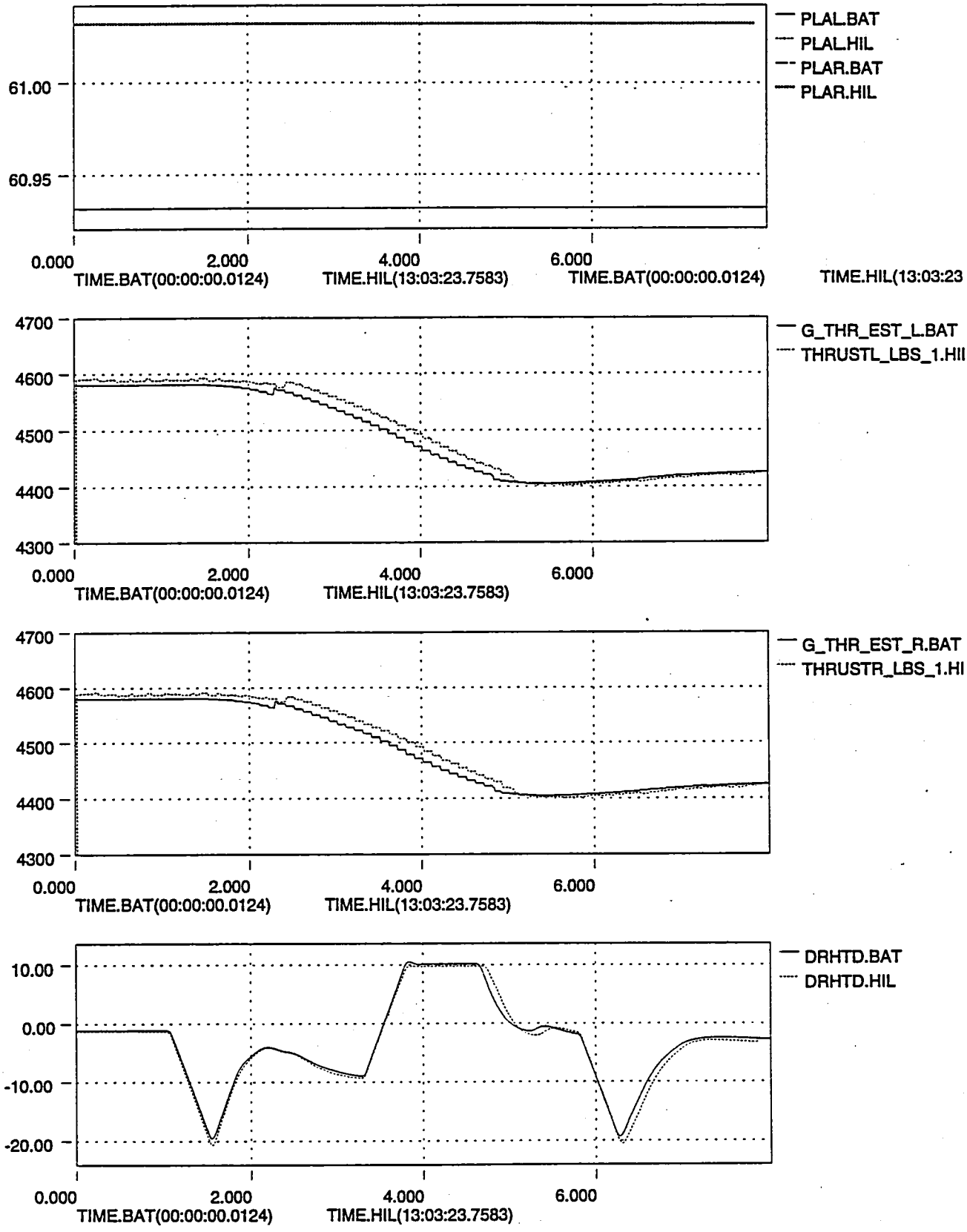
Figure 1 (Cont'd) - HIL Issue 10 - Impact Pressure Differences
CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 8/12



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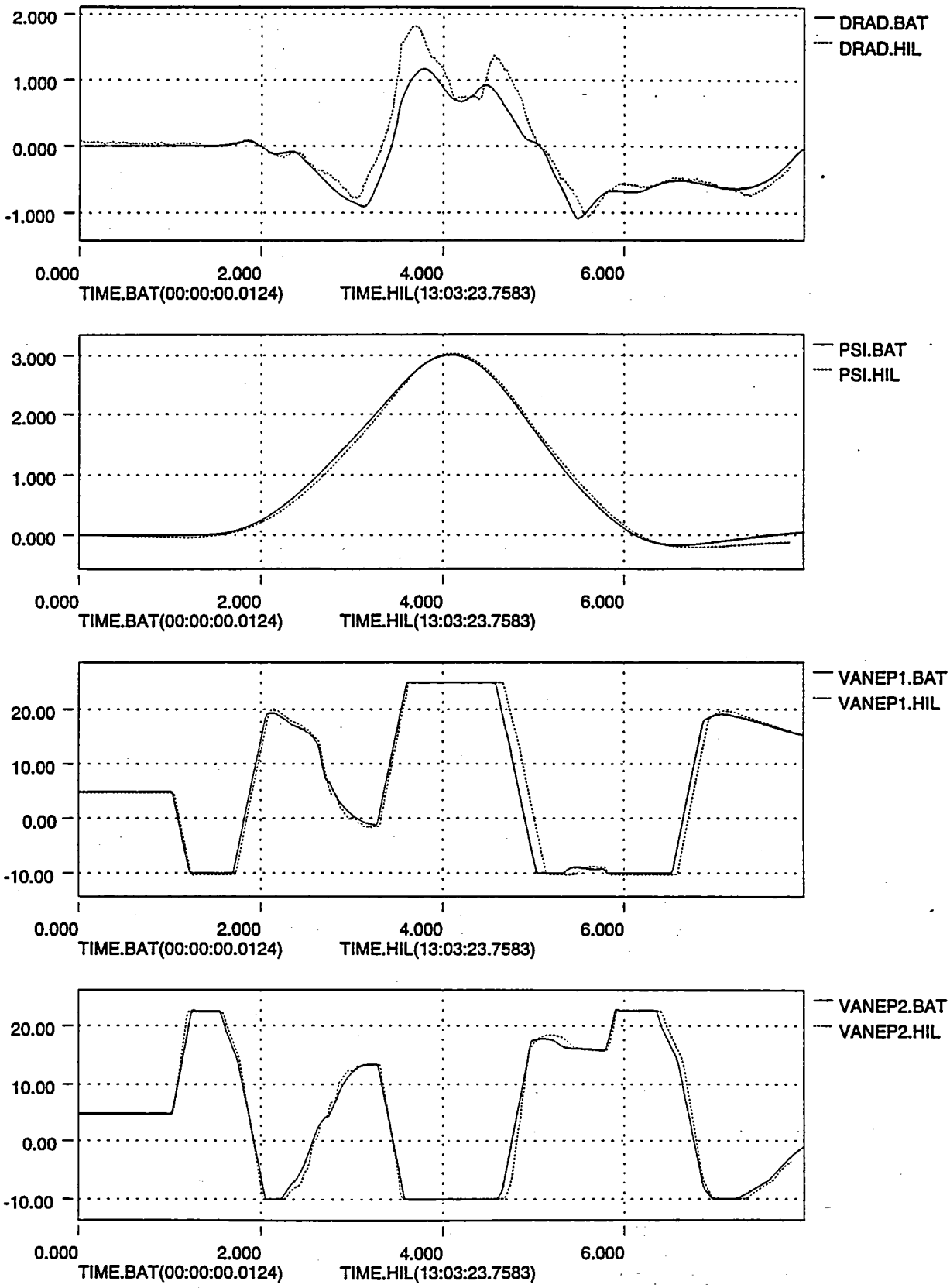
CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 9/12



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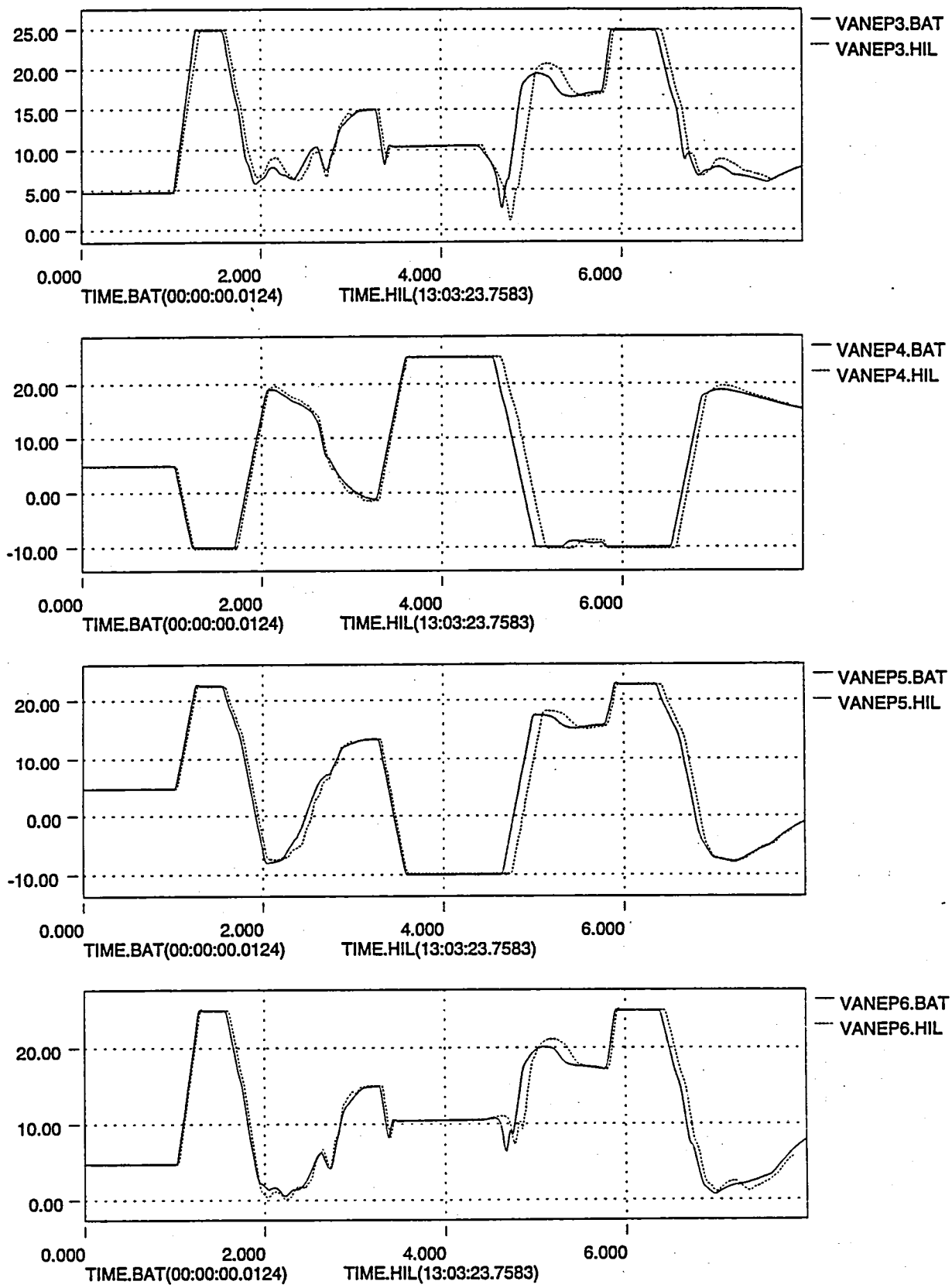
CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 10/12



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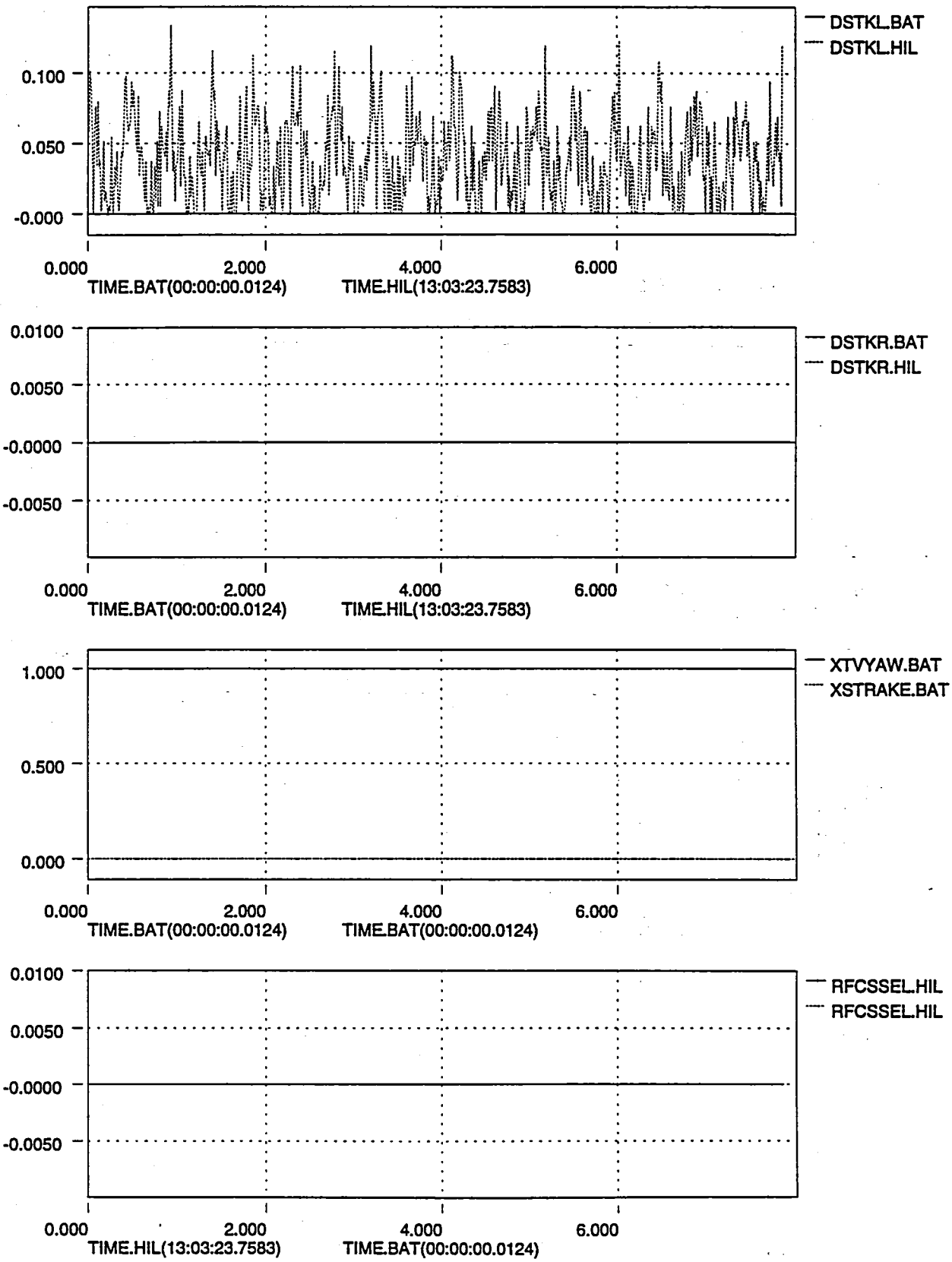
CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 11/12



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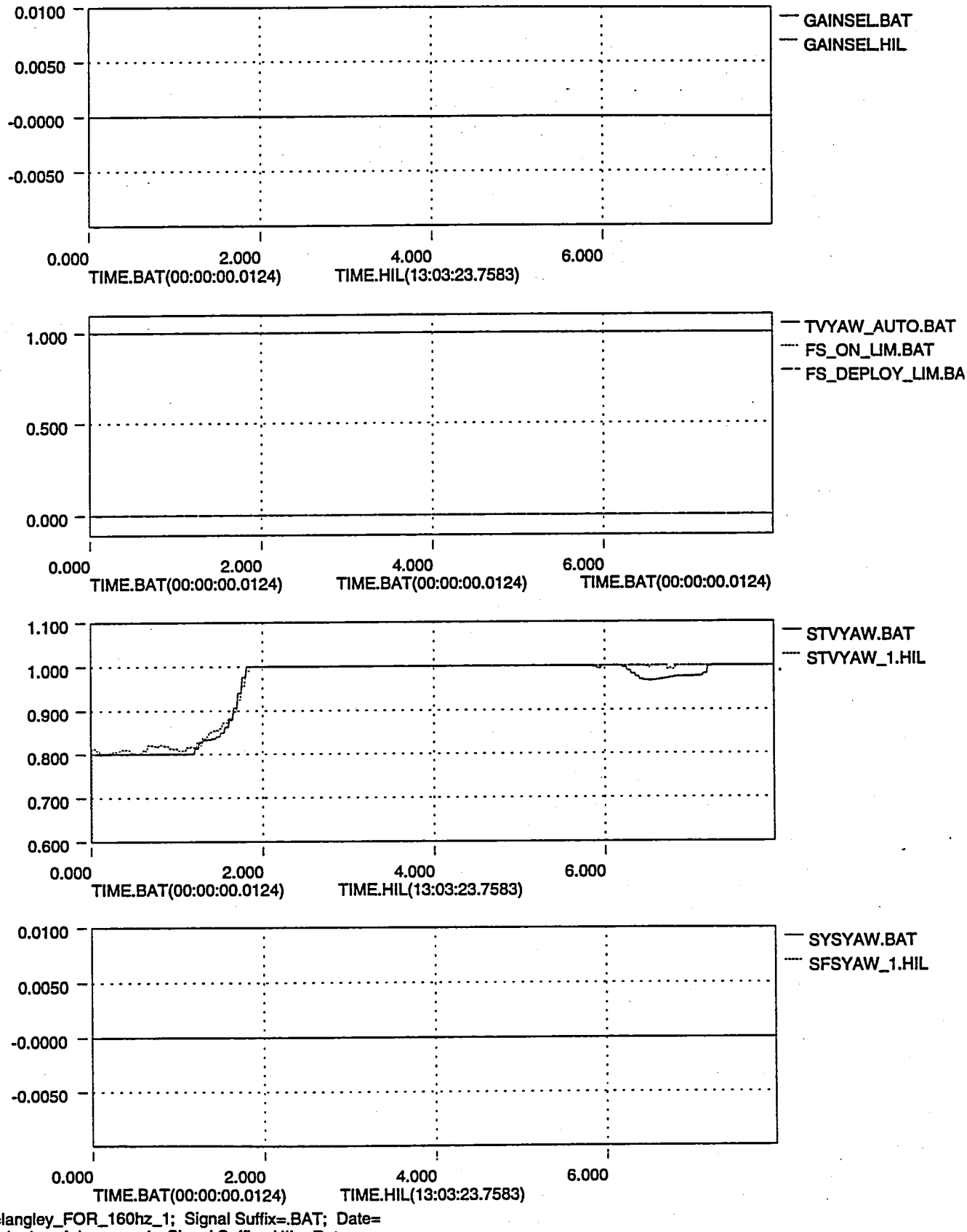
CASE_1__TV_Mode__.35-25k_trim_AOA_3_-2.5_in_ramp_dep page 12/12



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11 - Rudder Rate Limit.

Initially the rudder no load rate limit was 56 degrees/second instead of 75 degrees/second which is the correct value. A batch simulation change was made and corrected this discrepancy.

12 - Stabilator Position Limit.

The HIL negative position limit for the stabilator was noted incorrect during NASA-1A performance validation testing and is still incorrect. A negative position limit of -25 degrees can be observed when the limit should be -24 degrees. This difference causes negligible time history differences. See stabilator deflections for checkcase 28.

13 - Strake command differences between HIL runs.

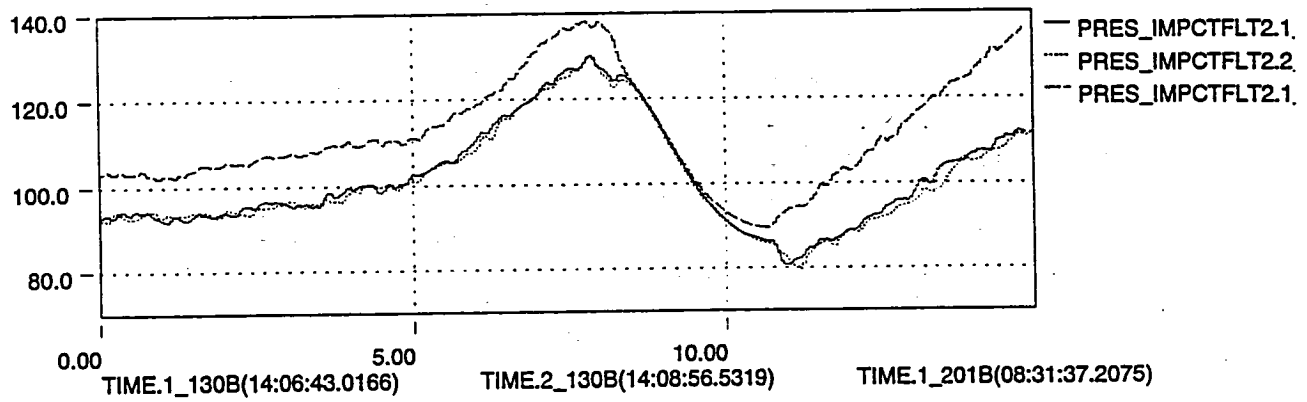
It's been observed from HIL time history runs that repeatability between HIL runs has produced noticeable differences in trim pitch stick deflections and strake deflections. Figure 1 plot 1 shows impact pressure (PRES_IMPCTFLT2) for 3 separate HIL runs, the first two were recorded on January 30, 1995, the third was recorded on February 1, 1995. Impact pressure varies between 12 - 20 psf during this time history. This results in a change in the angle-of-attack trim (AOA_TRM) used to adjust the pitch stick trim position (PIT_STCK_TTL). See plots 2, 3 and 4 on Figure 1. The change in trim pitch stick deflection is due to the differences in impact pressure between HIL runs.

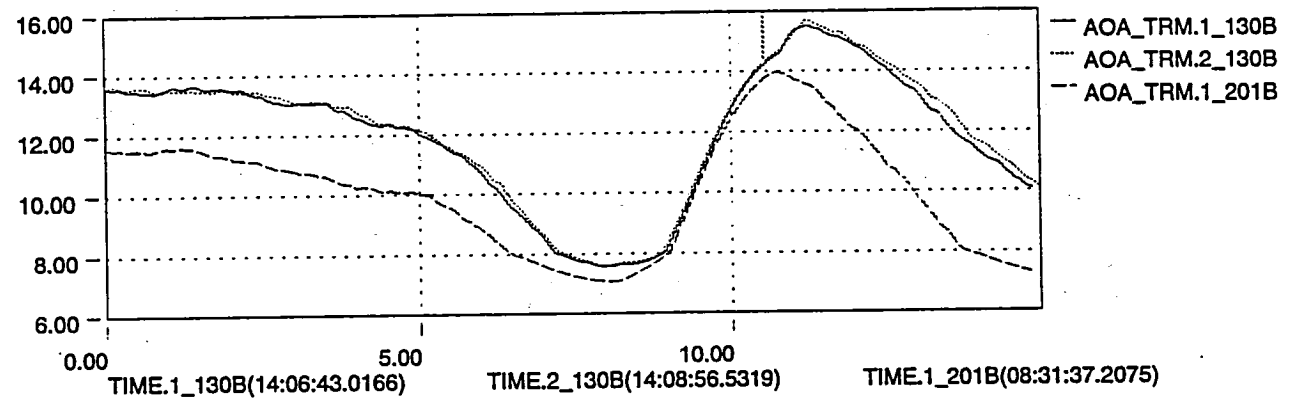
The change in pitch stick will produce changes in AOA. Figure 2, plot 1 contains the internal RFCS AOA (AOA). An expanded scale is shown on plot 2. The AOA changes result in the differences observed in the left and right strake commands (FSLCLIM_DEG and FSRCLIM_DEG respectively). See Figure 2 plots 3 and 4 along with page 3 plot 1 which shows FSRCLIM_DEG expanded.

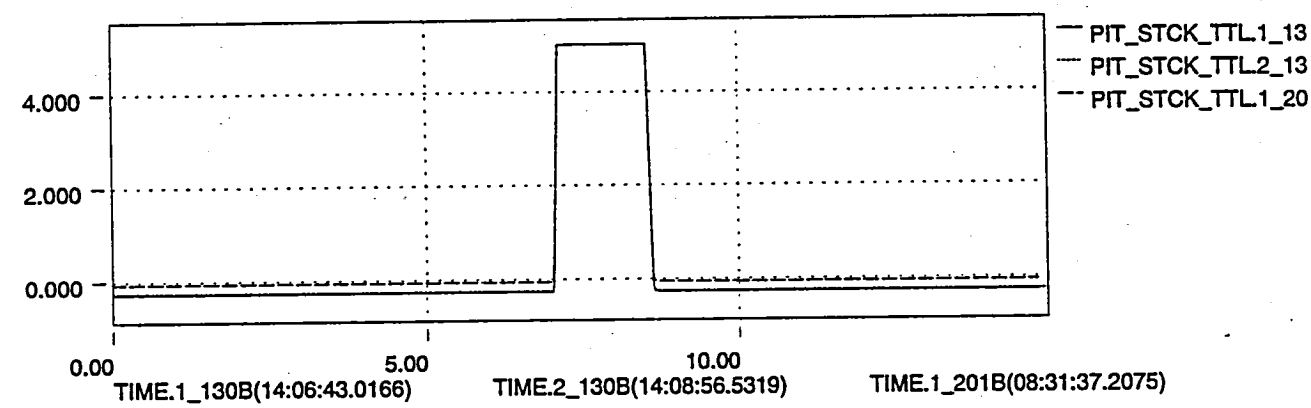
The strake engagement schedule in ANSER lateral/directional Pseudo controls can deflect the strakes 18 degrees per 1 degree of AOA change. The strake engagement schedule begins at 15 degrees AOA and allows full strake deflections of 90 degrees after 20 degrees AOA is reached. The conclusion for this issue was that the HIL is operating the strake engagement schedule according to the ANSER spec and that the the strakes are sensitive to AOA changes between 15 - 20 degrees AOA.

Figure 1 - HIL Issue 13

Thu Feb 2 08:28:37 1995







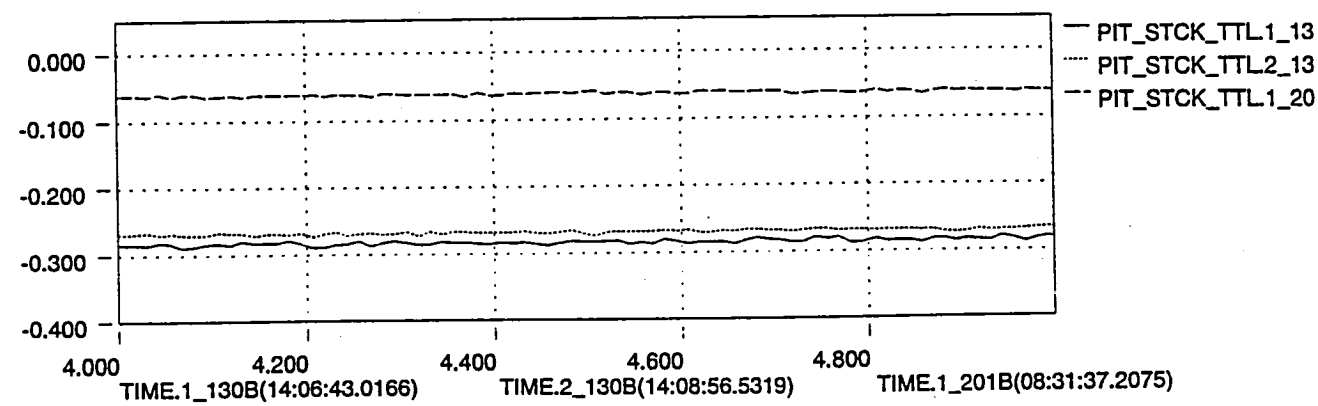


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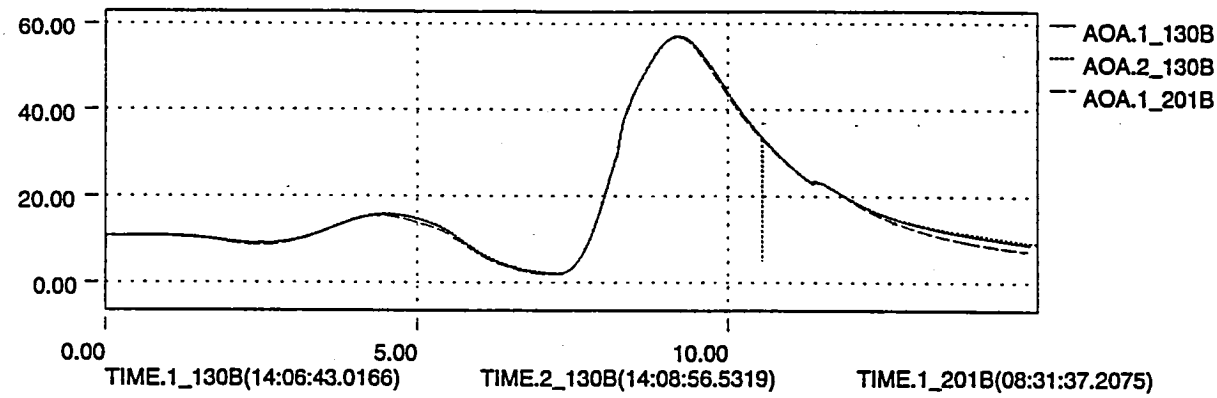
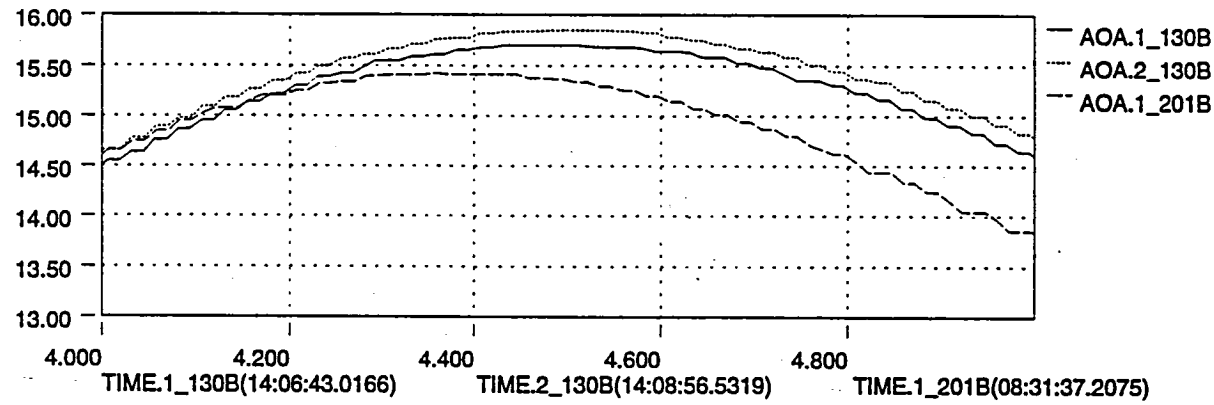
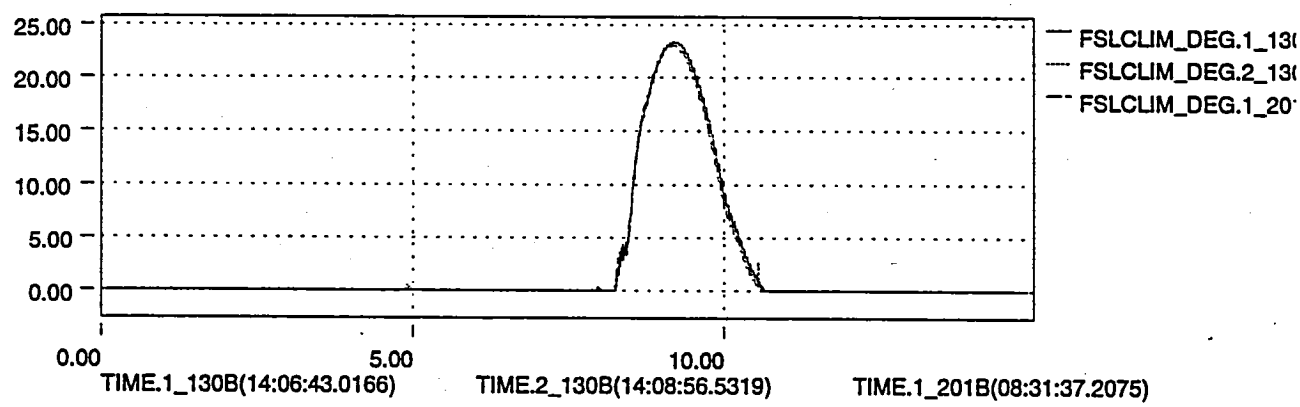
Figure 2 - H/L Issue 13

Thu Feb 2 08:33:57 1995







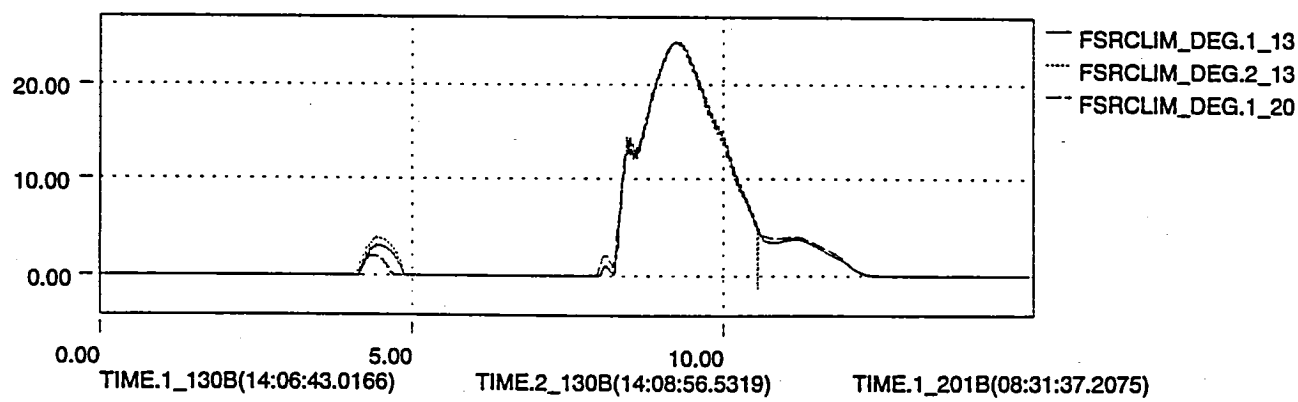


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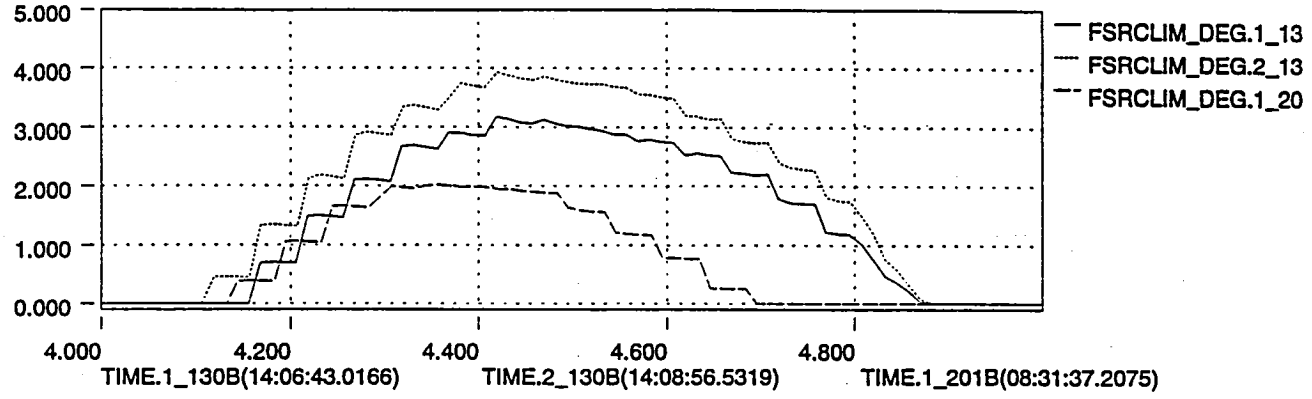
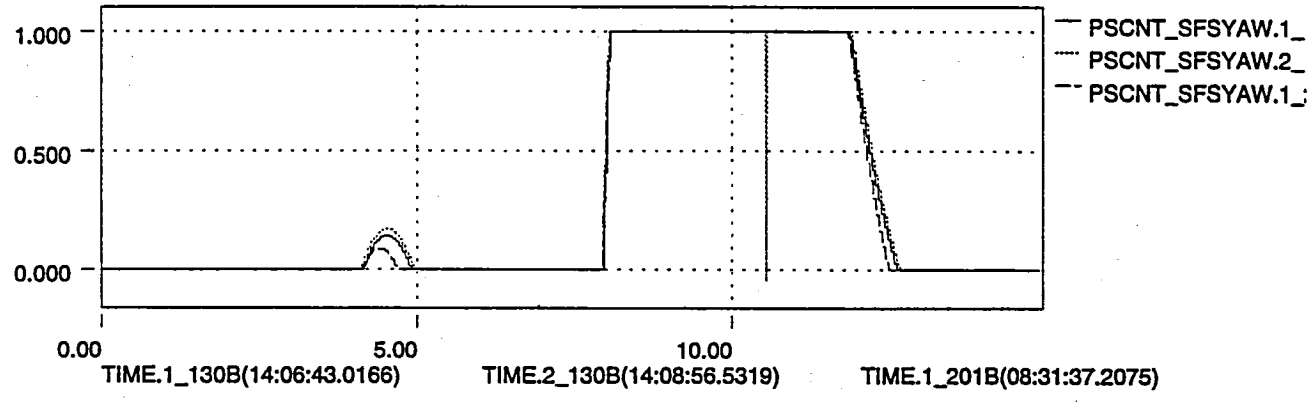
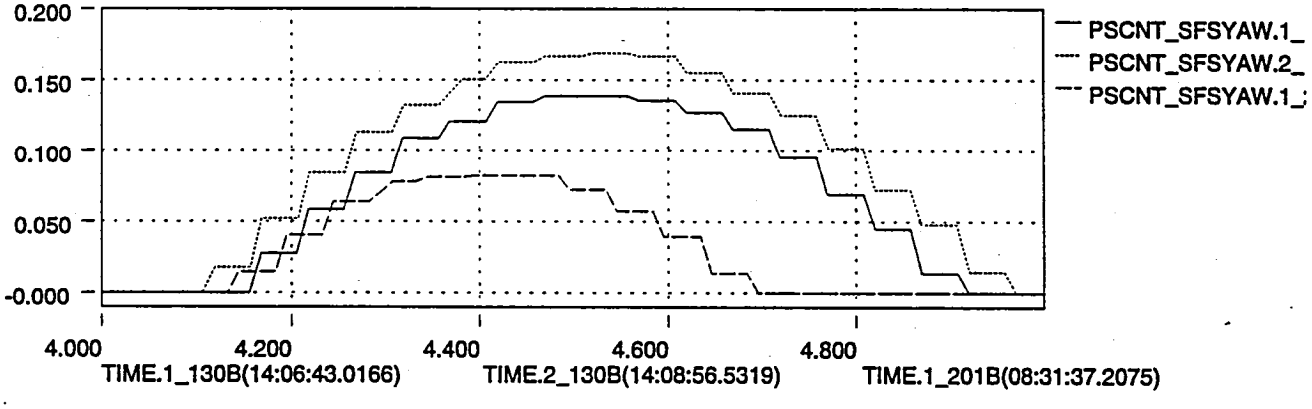
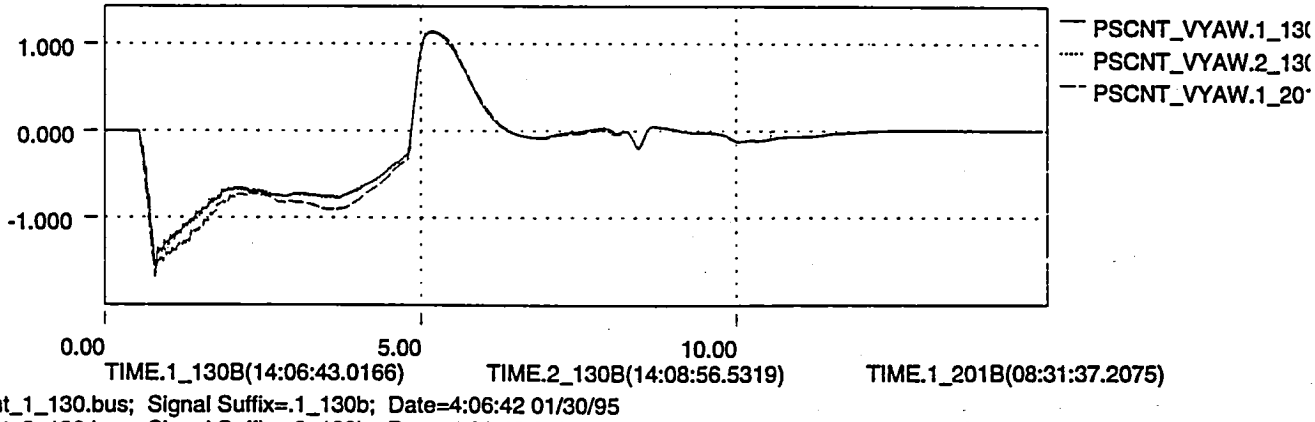
Figure 2 (Cont'd) - H/L Issue 13

Thu Feb 2 09:21:47 1995









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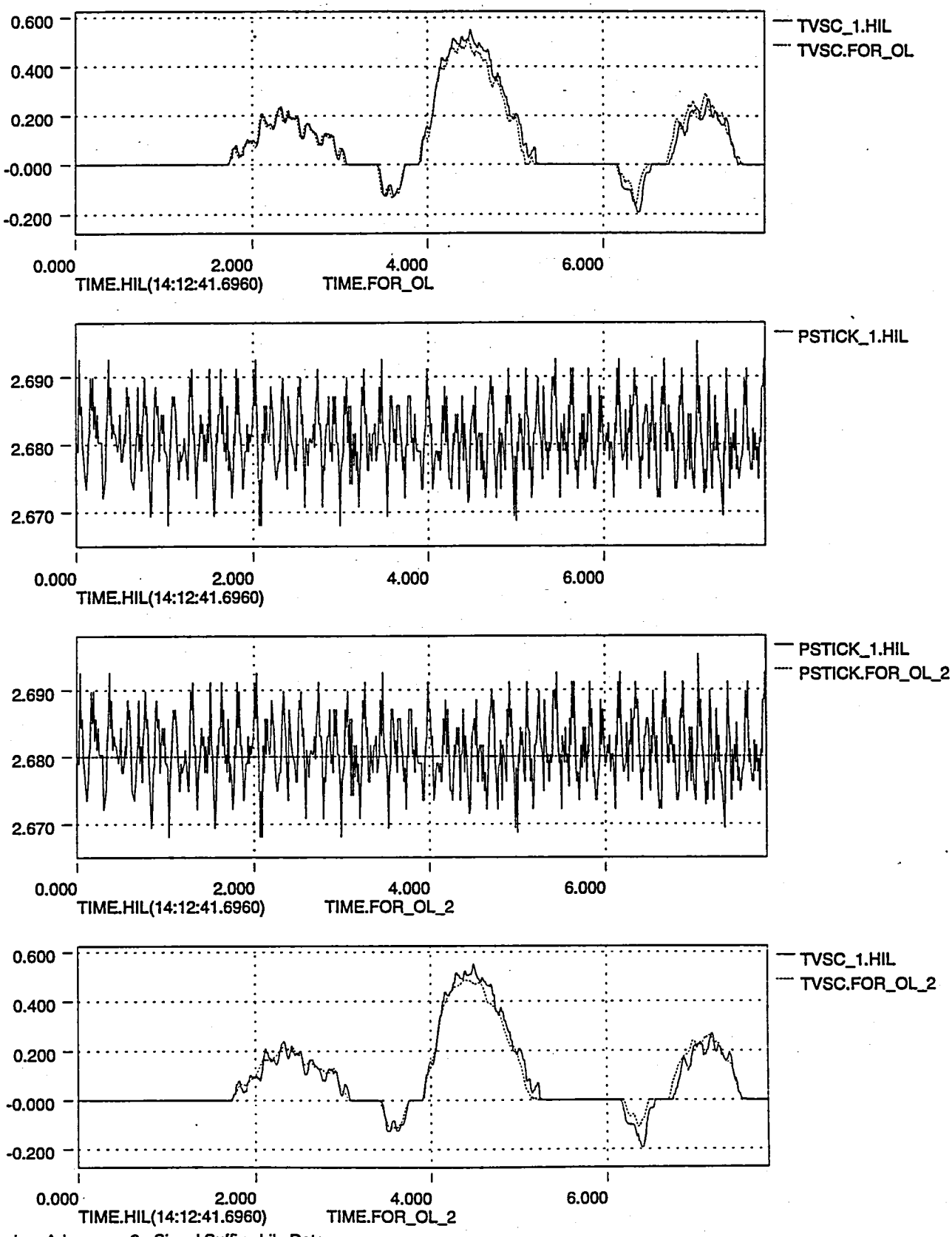
14 - Noise Observed in Pitch Jet Commands.

In the lateral stick and rudder pedal doublet checkcases which, do not result in large pitch jet commands to be produced, noise in the HIL pitch jet command has been observed. To isolate the driver of this noise, the HIL parameters needed to drive the Fortran Autocode control law representation open loop were used for checkcase 9 to duplicate the recorded HIL pitch jet command. The HIL time history does not contain all the control law inputs needed to drive the Fortran open loop and produce an exact result. In the instances the exact input is missing a substitution is made which will cause minor differences to exist, but these do not significantly effect the results. Figure 1 plot 1 shows this open loop result with an overplot of the HIL pitch jet command. Since the general noise characteristics for the pitch jet command can be duplicated open loop, each individual input to the ANSER longitudinal control system was analyzed to determine the effect on pitch jet command. The primary driver was found to be noise on pitch stick. Figure 1 plot 2 shows the HIL pitch stick command. On plot 3, pitch stick command from the HIL is plotted against a fixed value of 2.68 inches used in the open loop analysis. On plot 4 the resulting pitch jet command is shown against the HIL response. The open loop pitch jet command shows less noise than the HIL time history. The magnitude of the noise on pitch jet command is small enough that this should not be considered a problem or noticeable to the pilot during flight test.

Tue May 23 08:46:24 1995

Figure 1 - HIL Issue 14 - Noise in Pitch Jet Command



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15 - Impact Pressure Transition.

Slight differences in trim has been observed between Batch and HIL simulation due to the simulation setups. The models and hardware used in the Batch and HIL simulations are discussed in the ANSER Performance Validation Test Plan (Appendix A). The HIL simulation uses the actual flight hardware Mission computer where the Batch simulation uses a Fortran model. When a trim at 30 degrees AOA is performed, a slight disagreement between the batch and HIL simulation AOA is obtained. The discrepancy in AOA is on the order of 0.05 degrees. This small difference will cause a significant difference in the closed loop time history response since RFCS AOA determines the transition time when impact pressure will change between the Airdata computer and Mission computer sources. Also, another factor which makes the transition more noticeable in the HIL is the fact that the magnitude of impact pressure from the Airdata computer model in the HIL is higher than the Batch simulation by as much as 25%. See HIL Issue 10 discussion. This causes a large input change between the impact pressure sources and a transient to occur in the ANSER longitudinal control laws. This transient is small and has not been noted as a problem during HIL piloted simulation.

Figure 1 contains a Batch time history comparison versus the HIL for checkcase 6 with 2 modifications to the Batch simulation run. The first involves impact pressure which was biased in the Batch simulation by an additional 17 psf. The second change was made to the batch simulation script, the trim AOA was decreased by 0.05 degrees to 29.95 degrees to more closer match the HIL trim point. Referencing Figure 1 versus the time history comparison shown in Appendix B for this same checkcase a closer match has been obtained. Some discrepancy still occurs and is due to the impact pressure difference above 30 degrees AOA. Above 30 degrees AOA, errors of up to 10% have been observed between the Mission computer model and the actual flight hardware. Figure 2 presents a Batch simulation run with the same modifications shown in Figure 1 with the addition of a 5 psf lower bias added to the Batch impact pressure from the Mission computer model. Comparing Figure 2 against Figure 1 a better match has been obtained.

Figure 1 - HIL Issue 15 - Impact Pressure Transition
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 1/12

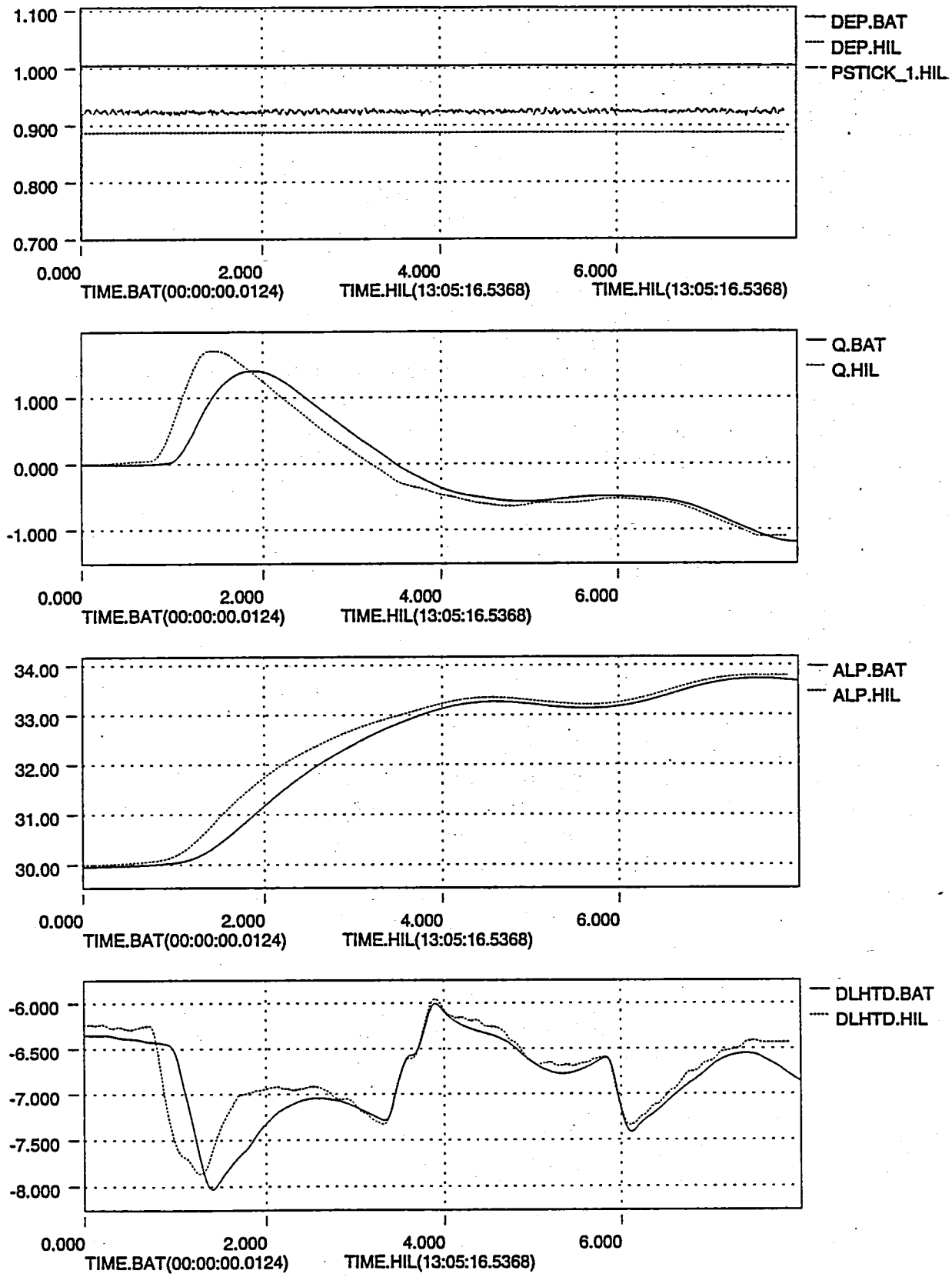

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Figure 1 (Cont'd) - HIL Issue 15 - Impact Pressure Transition
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 2/12

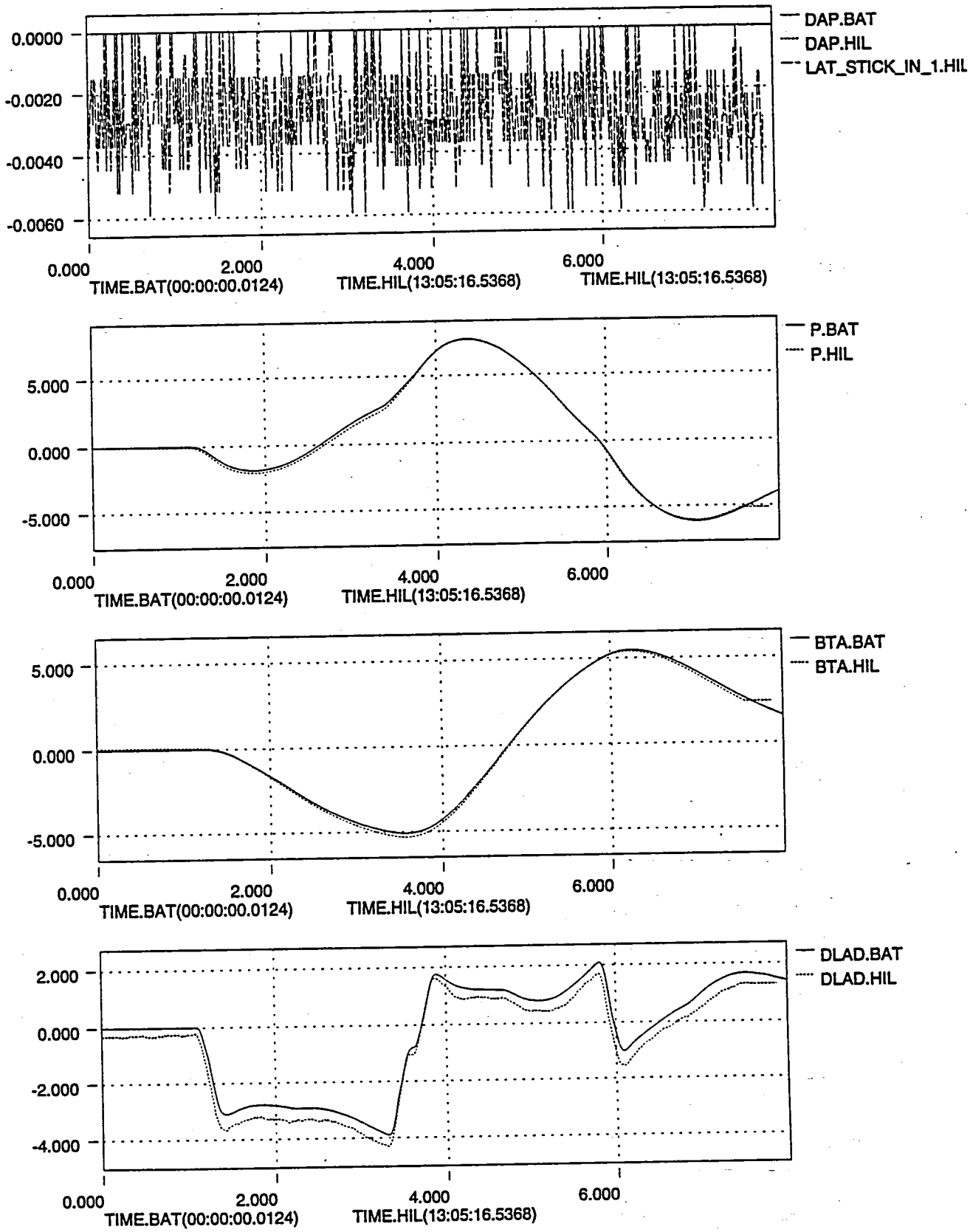

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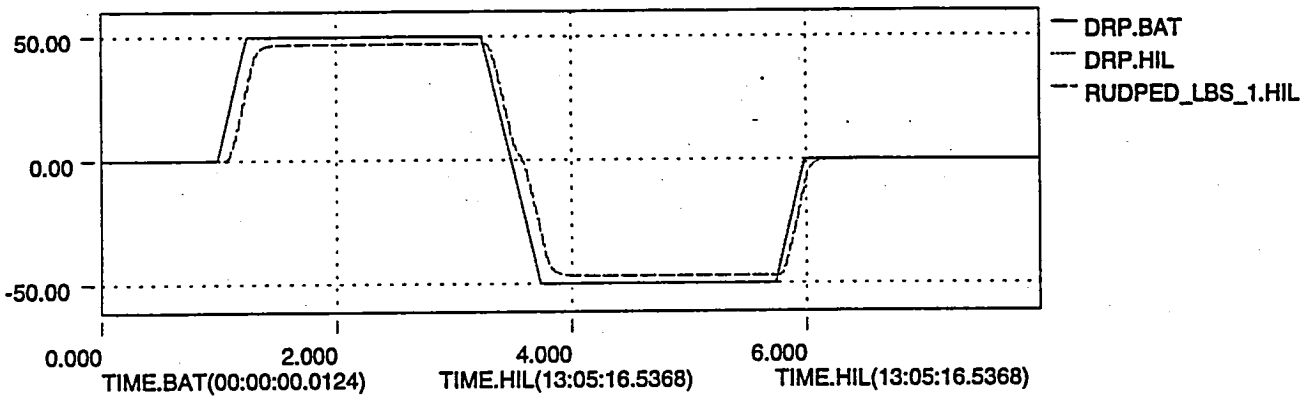
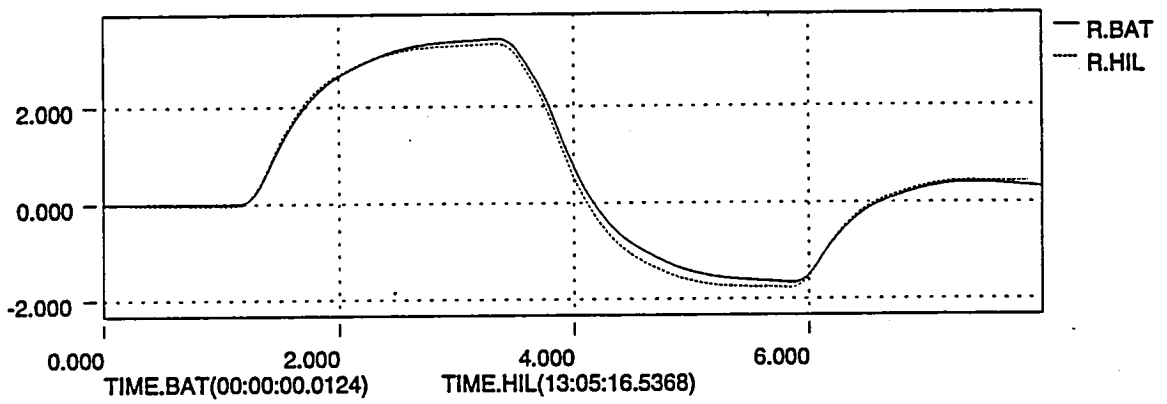
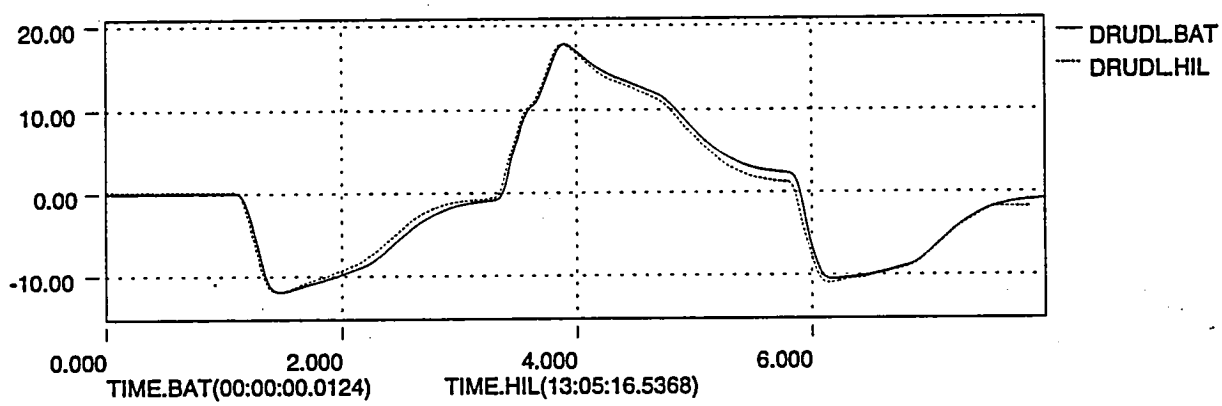
Figure 1 (Cont'd) - HIL Issue 15 - Impact Pressure Transition
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 3/12







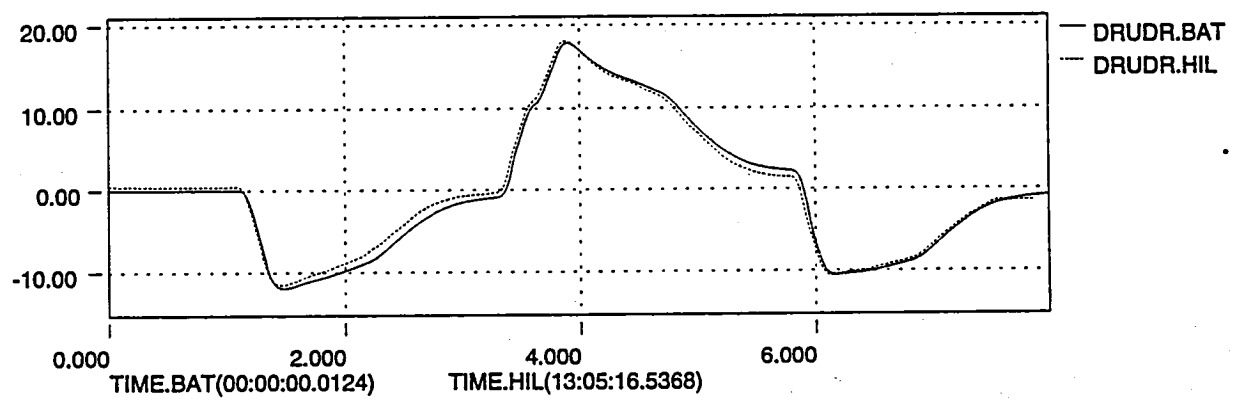


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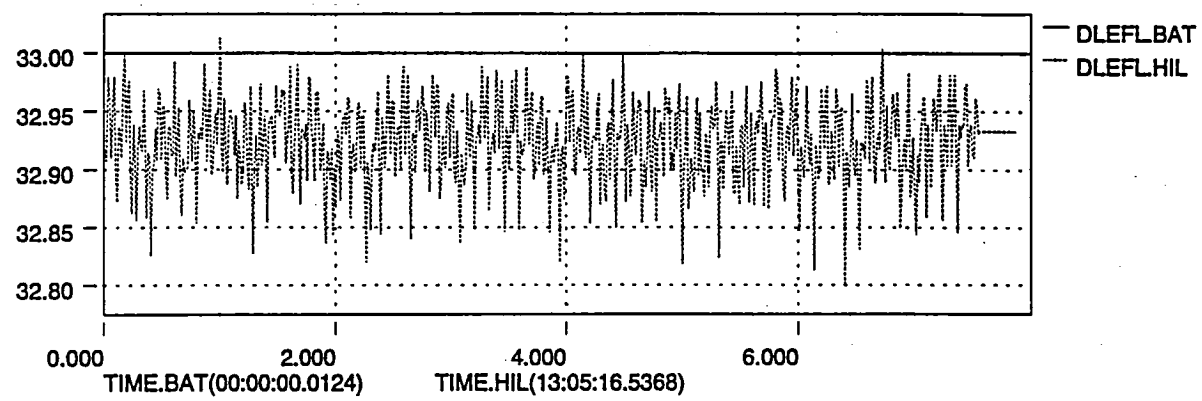
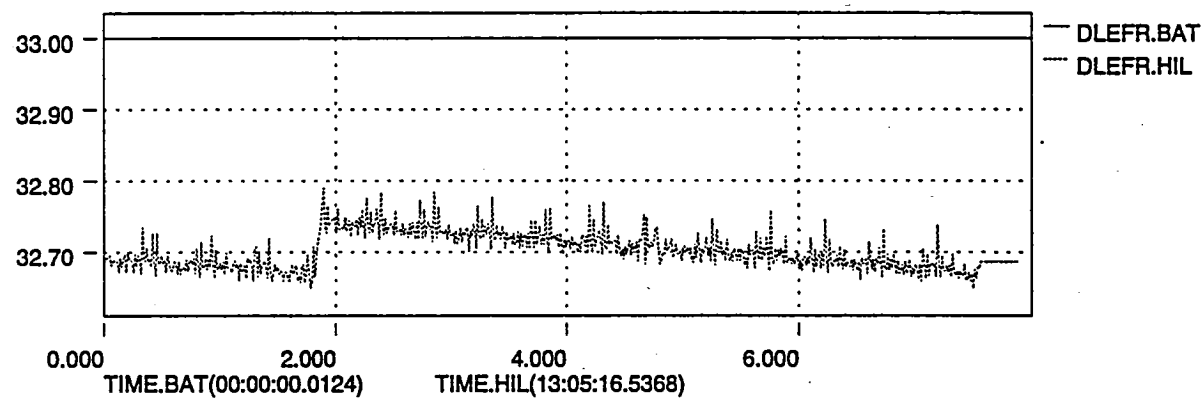
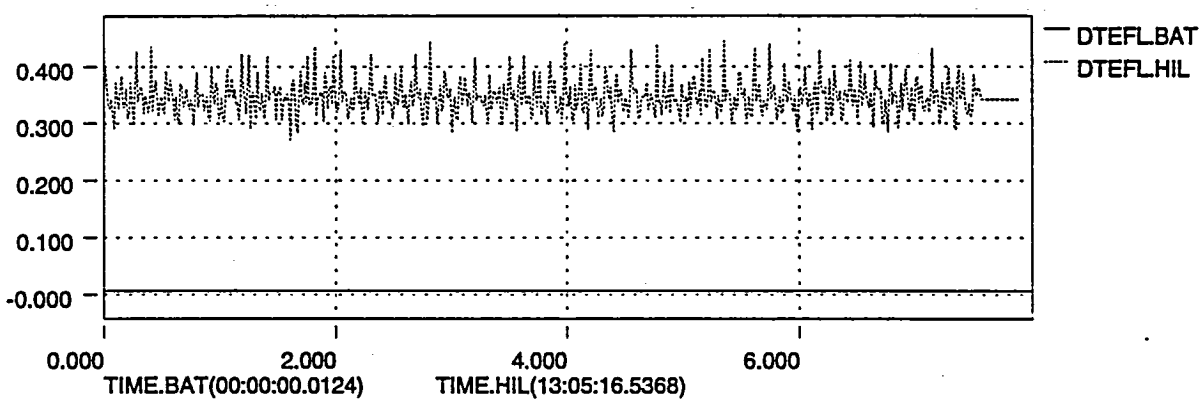
Figure 1 (Cont'd) - HIL Issue 15 - Impact Pressure Transition
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 4/12







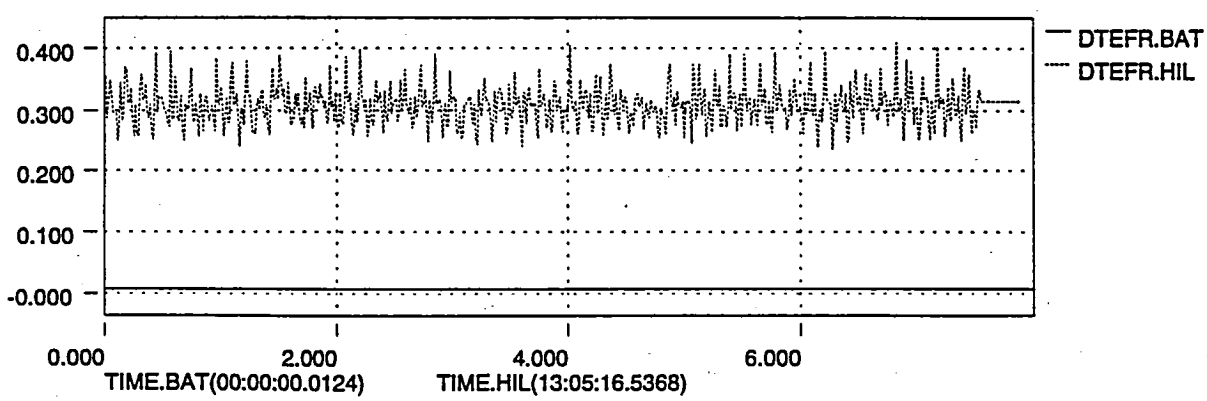


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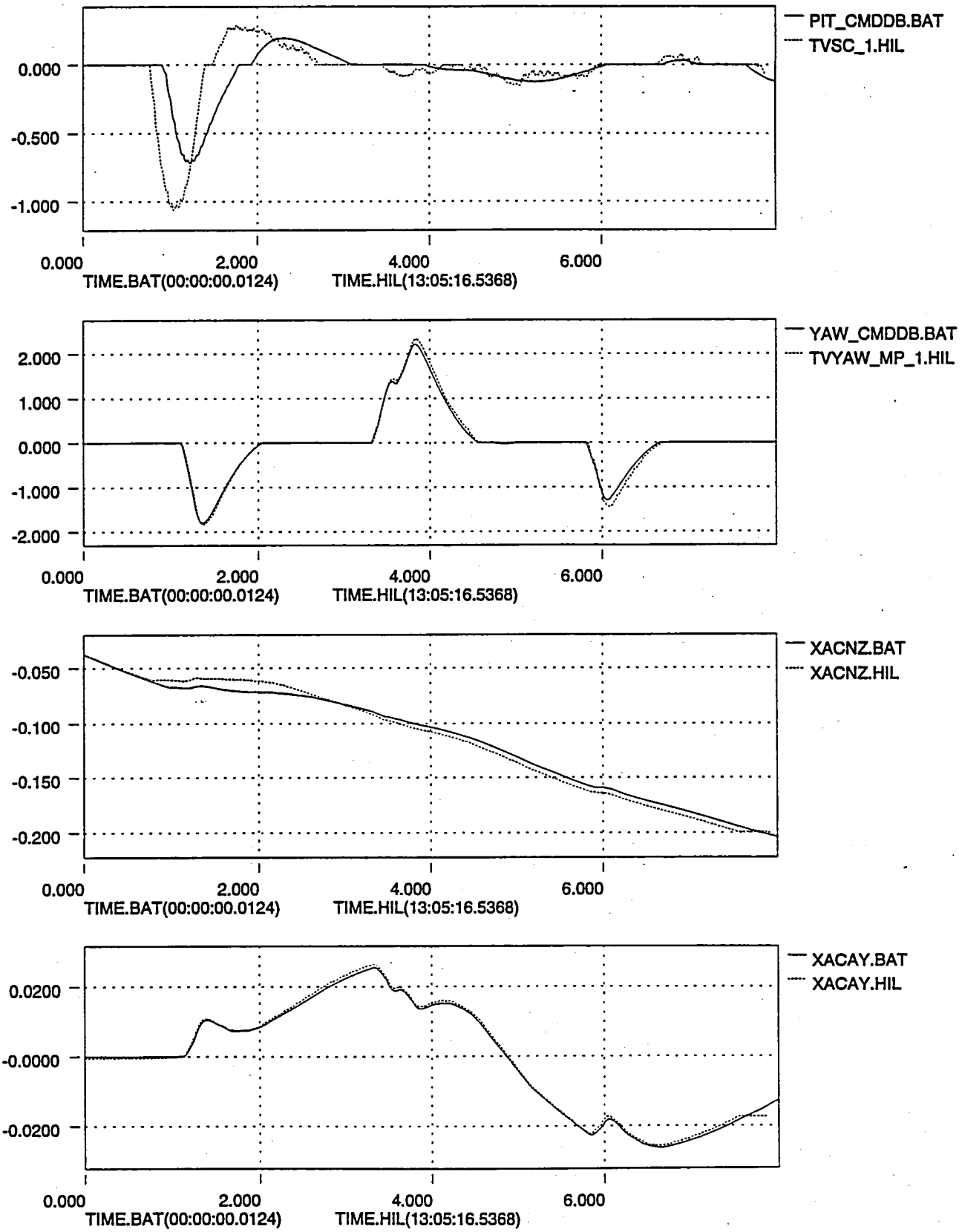
Figure 1 (Cont'd) - HIL Issue 15 - Impact Pressure Transition
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 5/12



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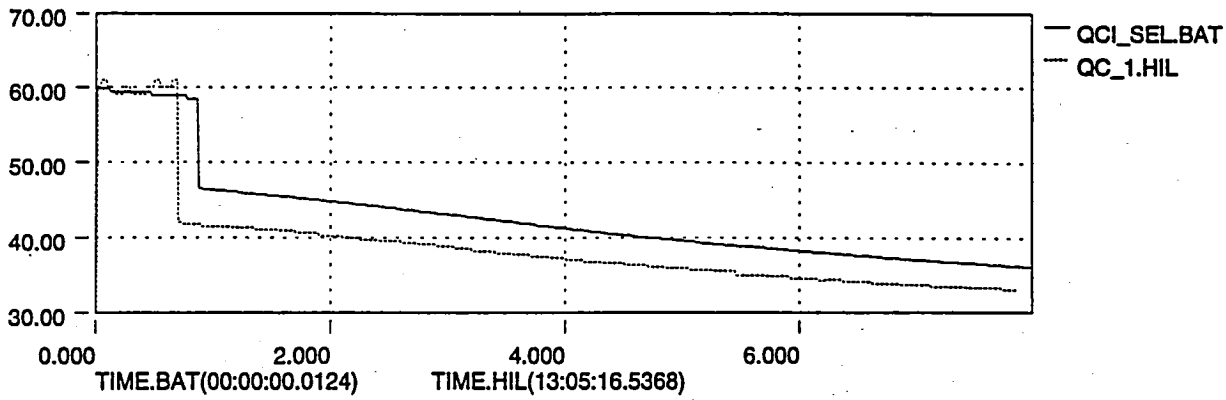
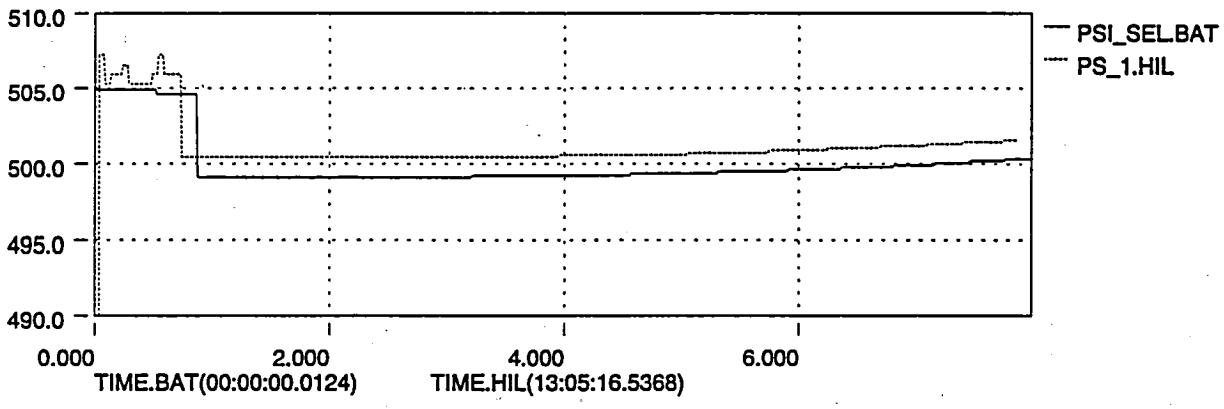
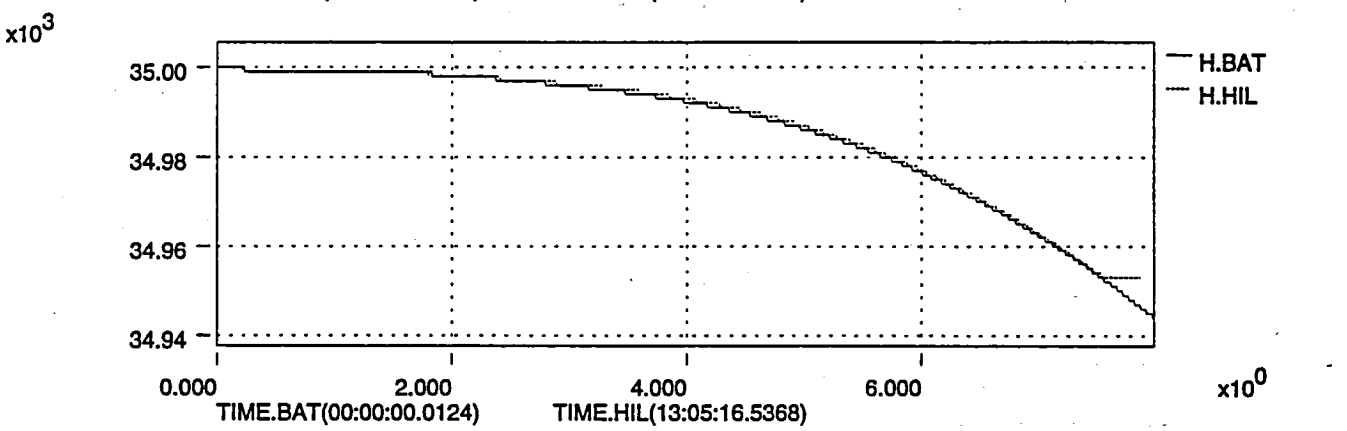
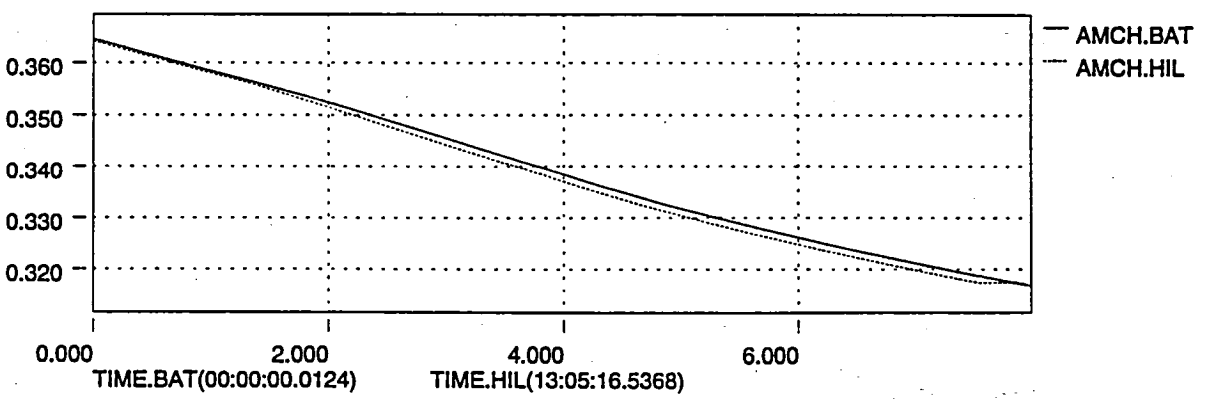
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 6/12









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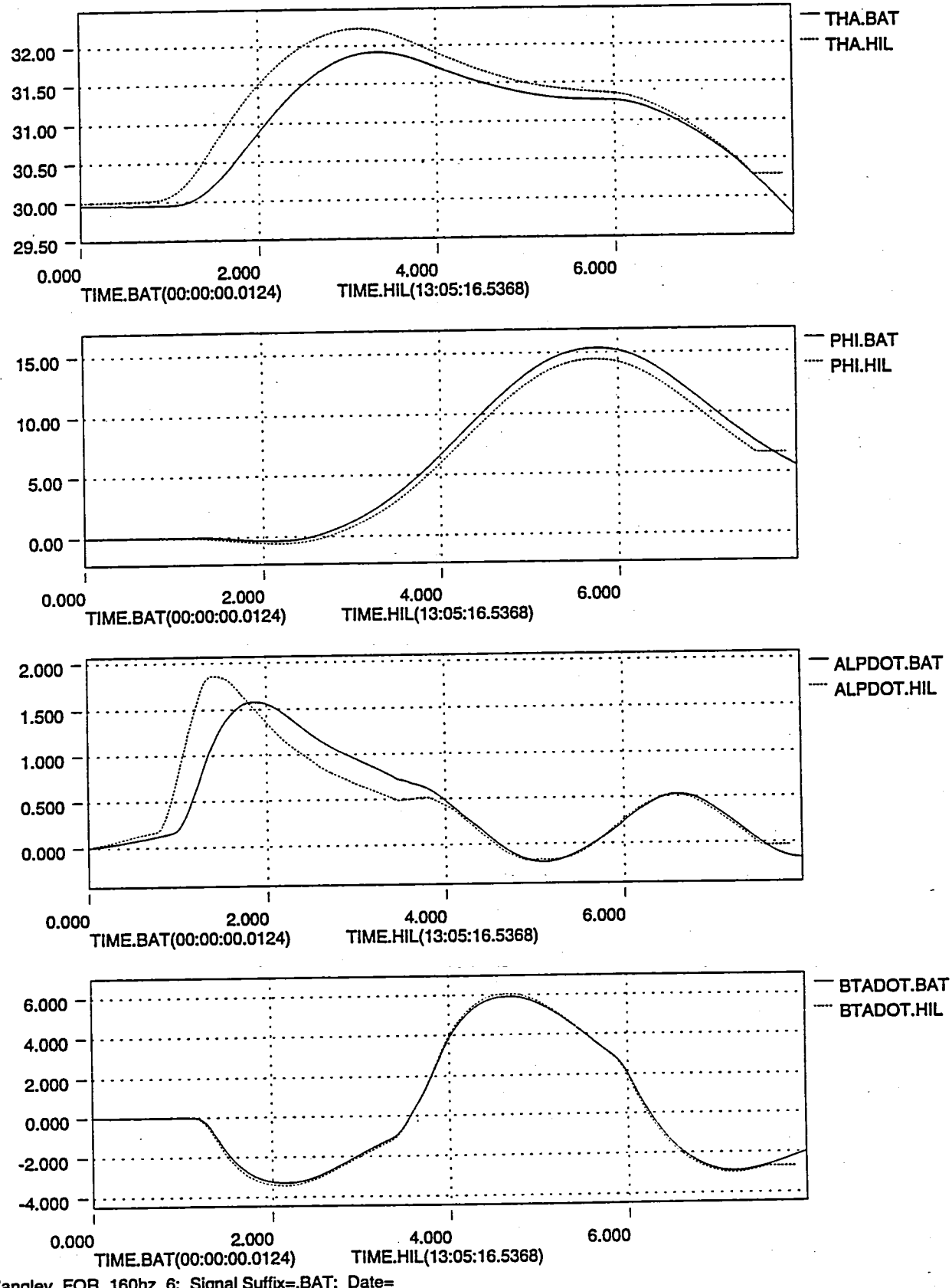
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 7/12



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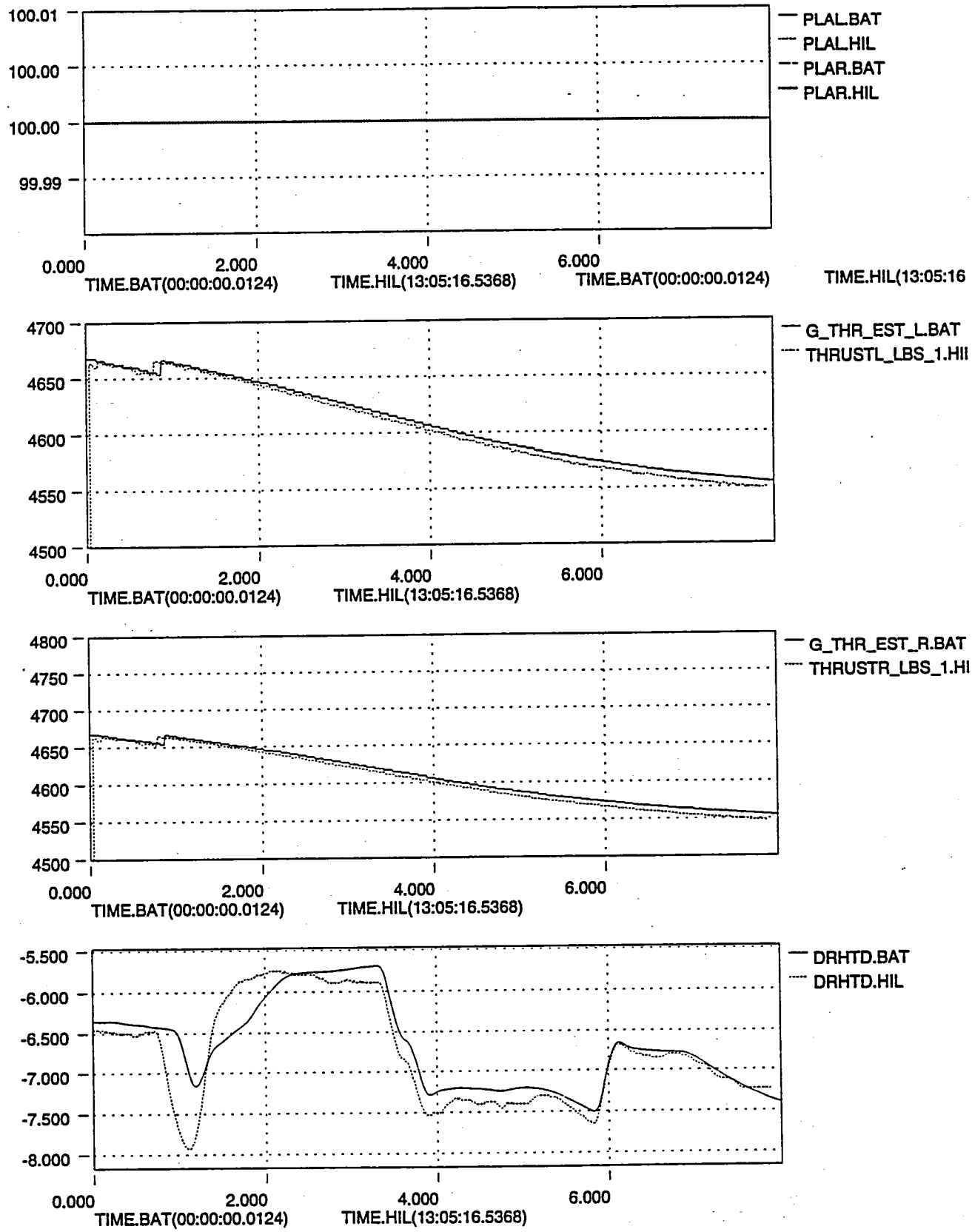
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 8/12



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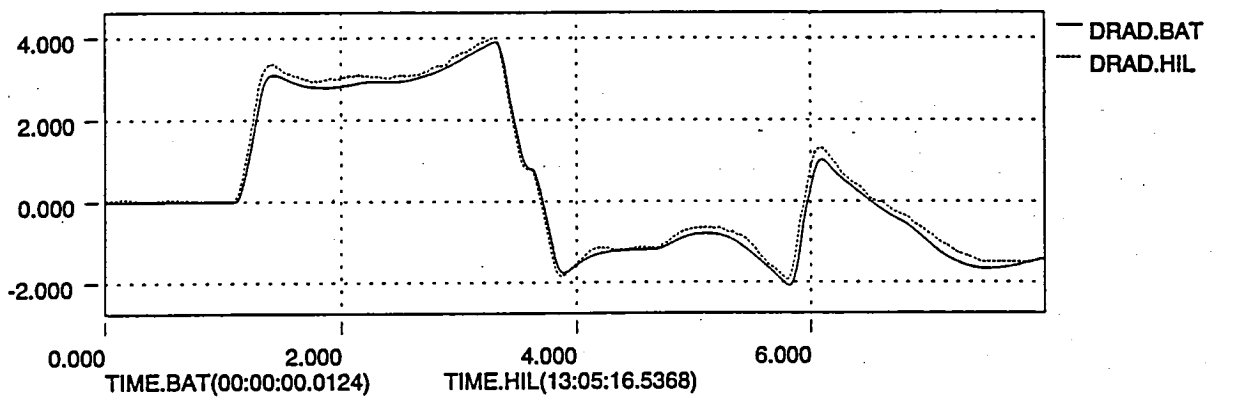
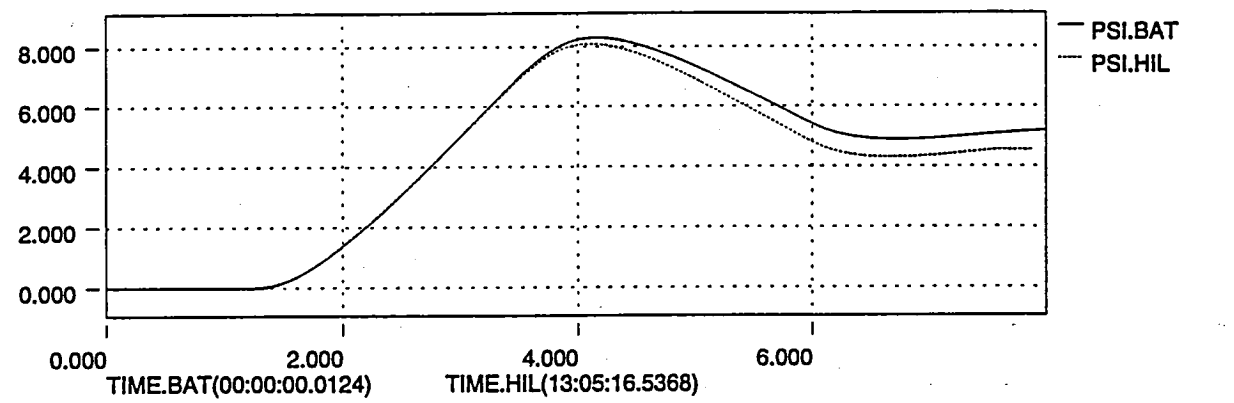
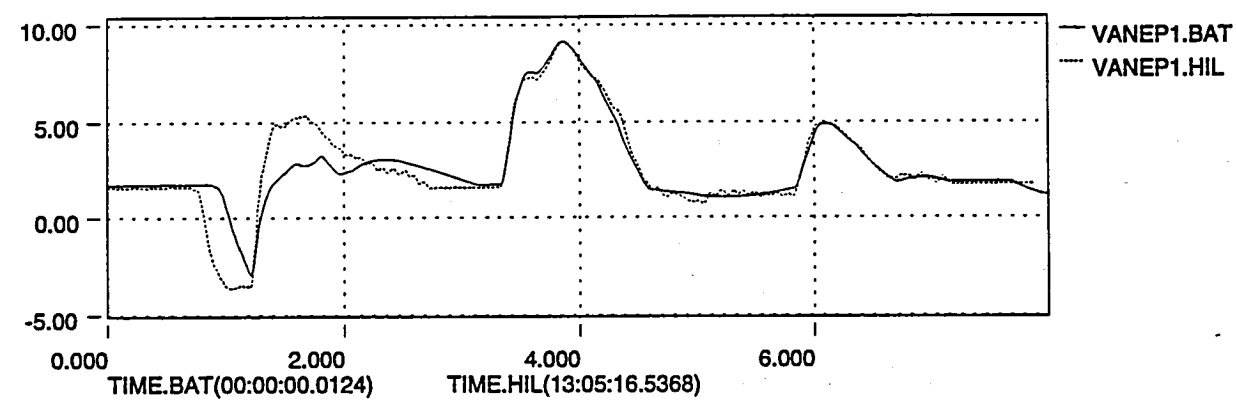
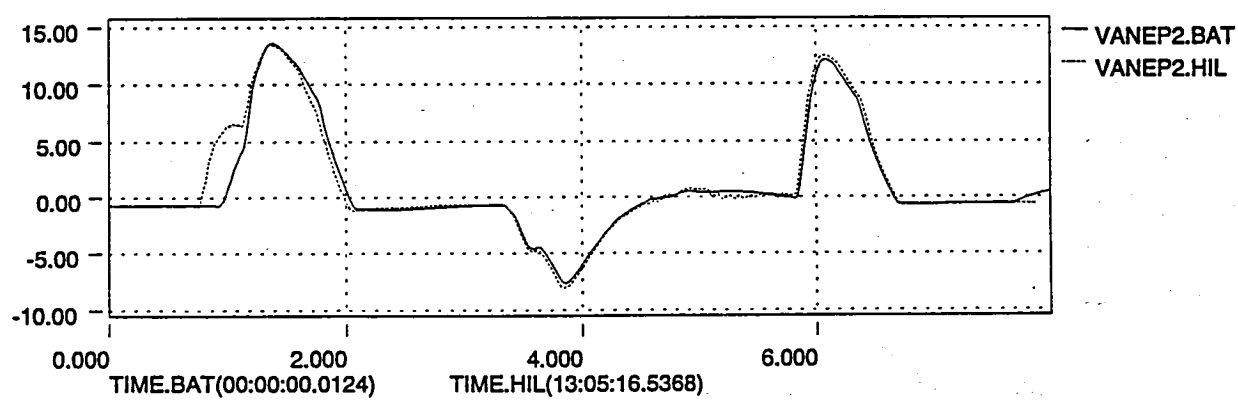
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 9/12









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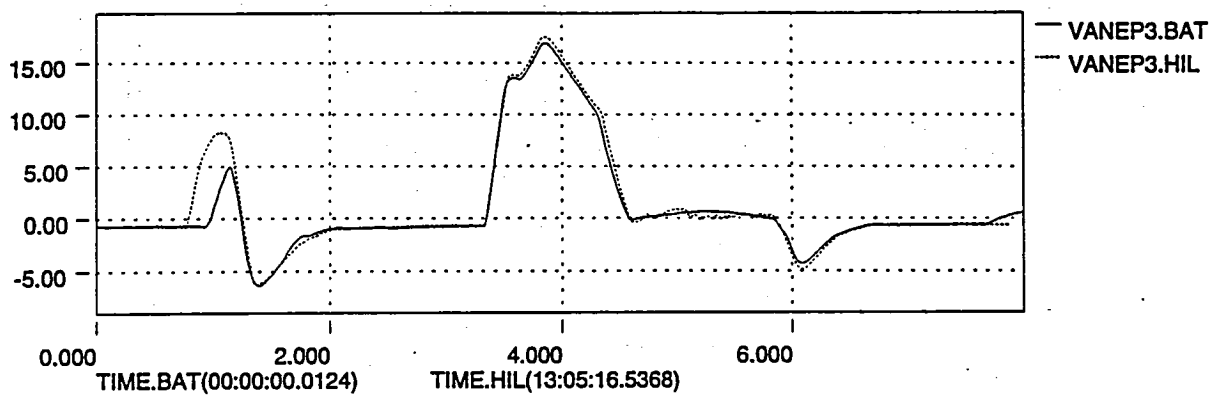

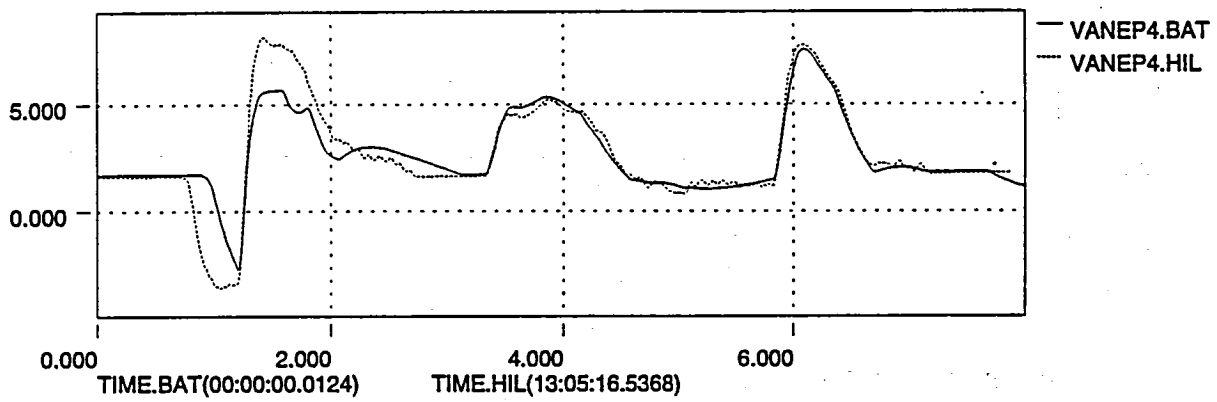

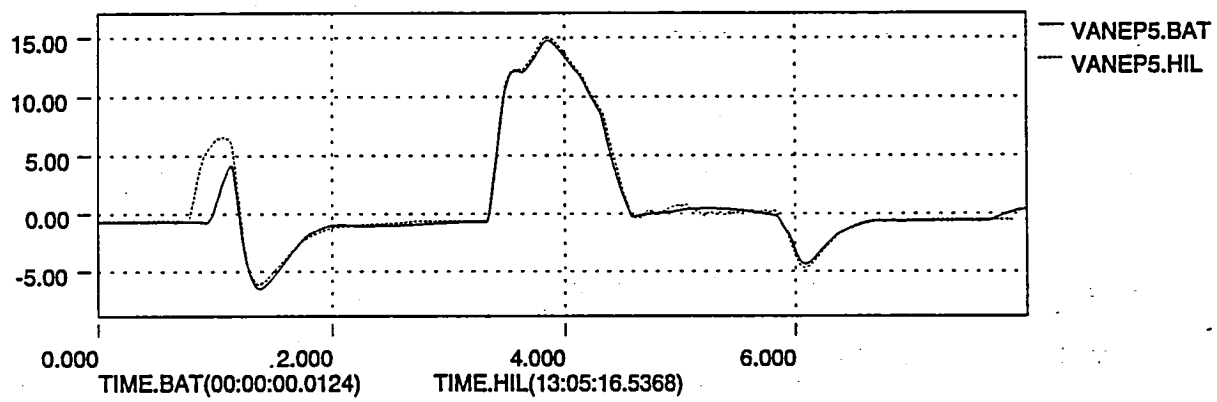

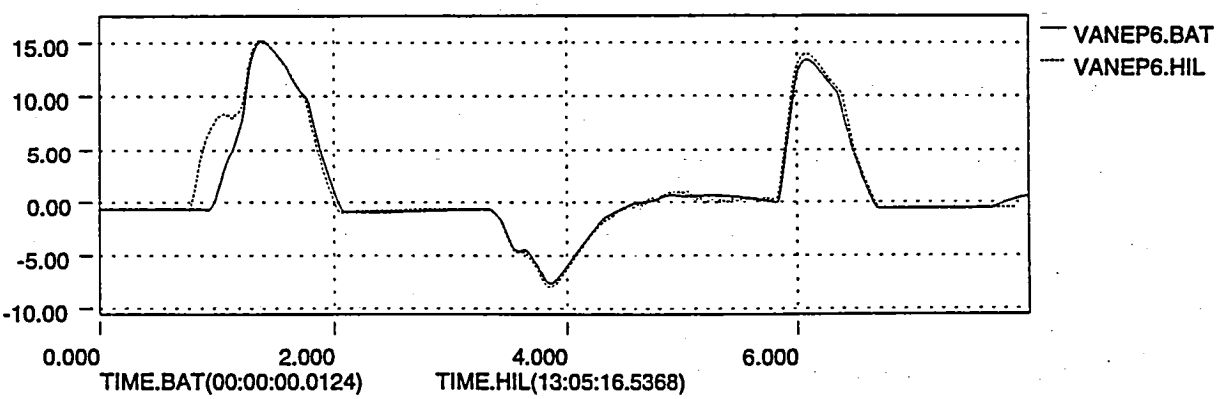

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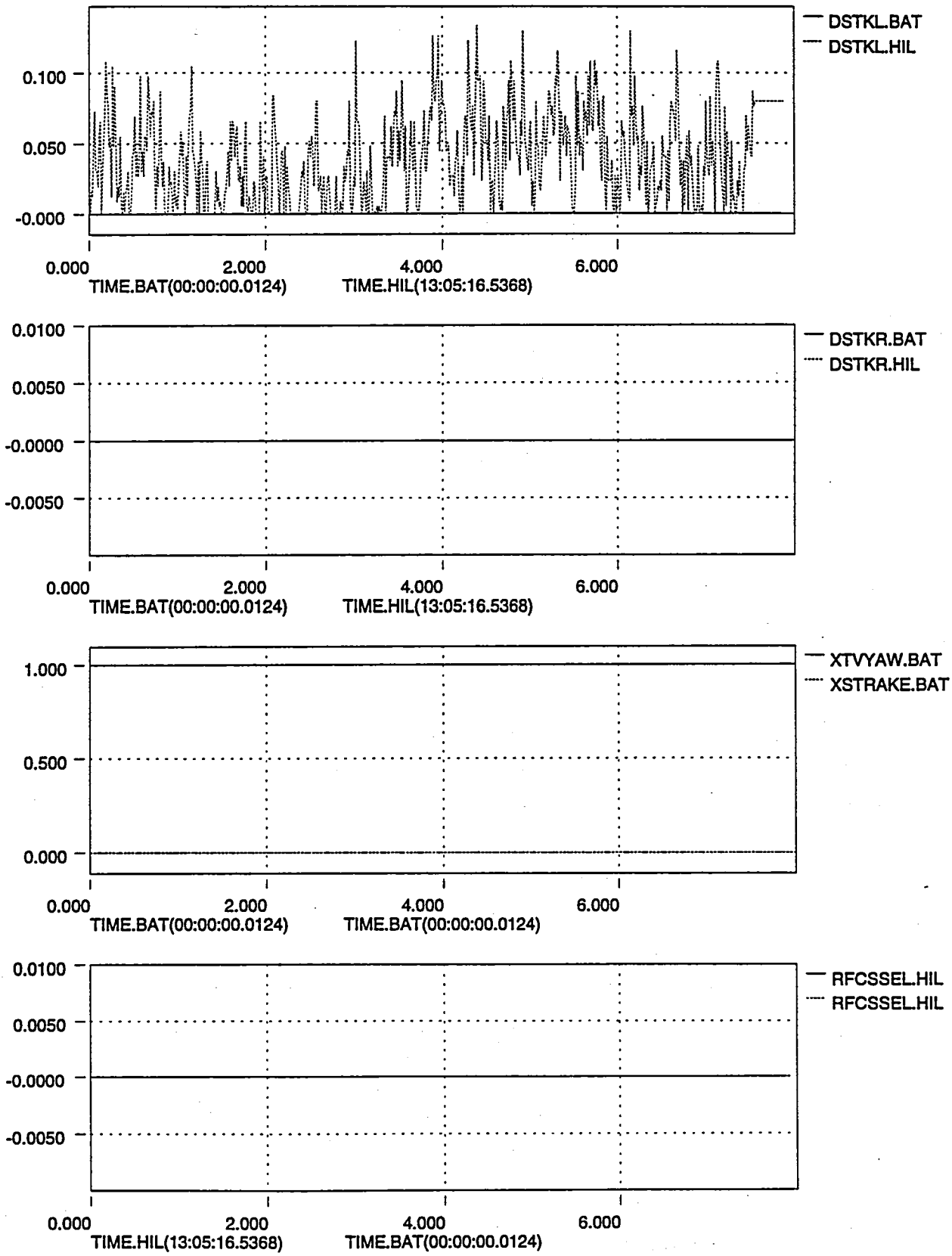

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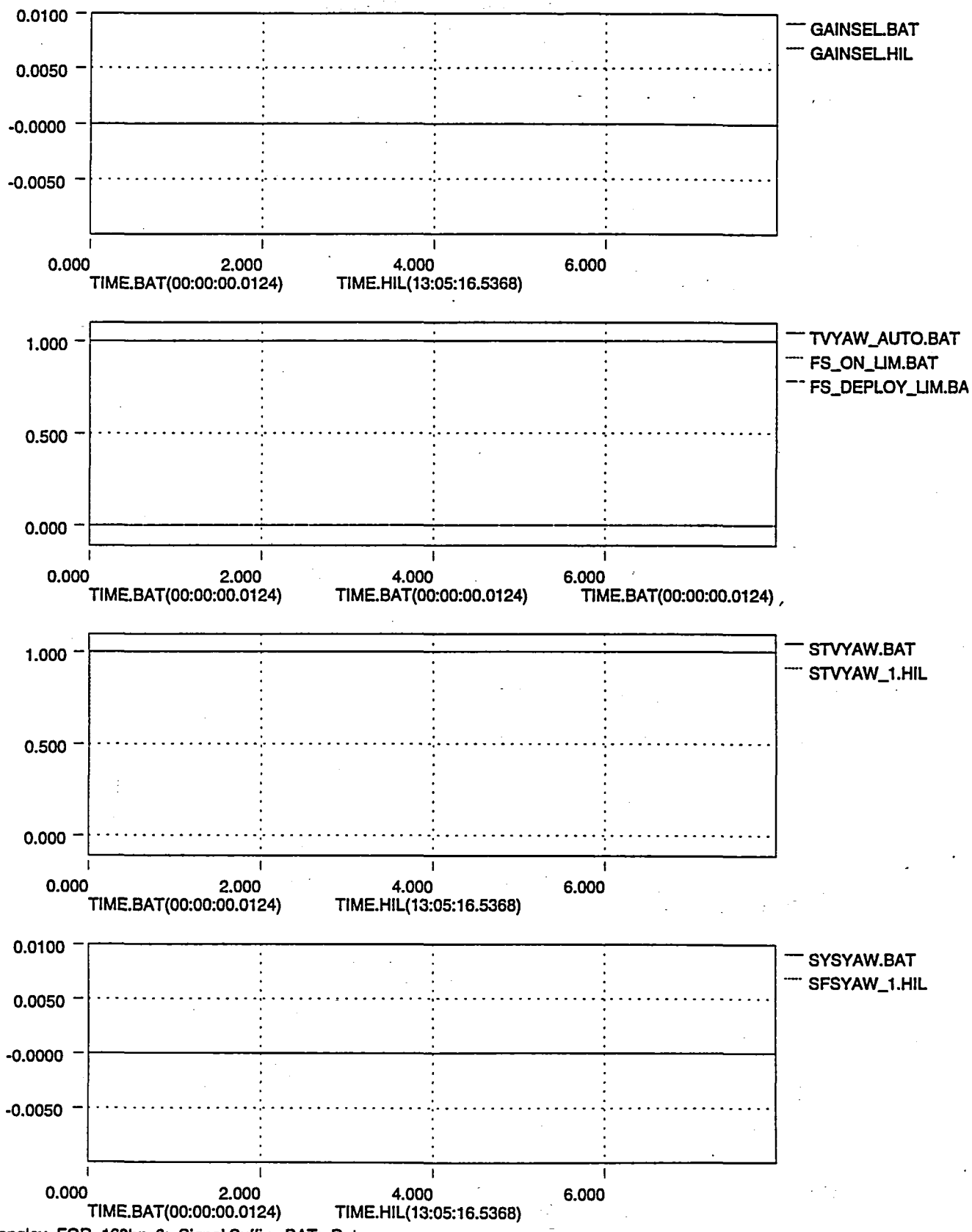

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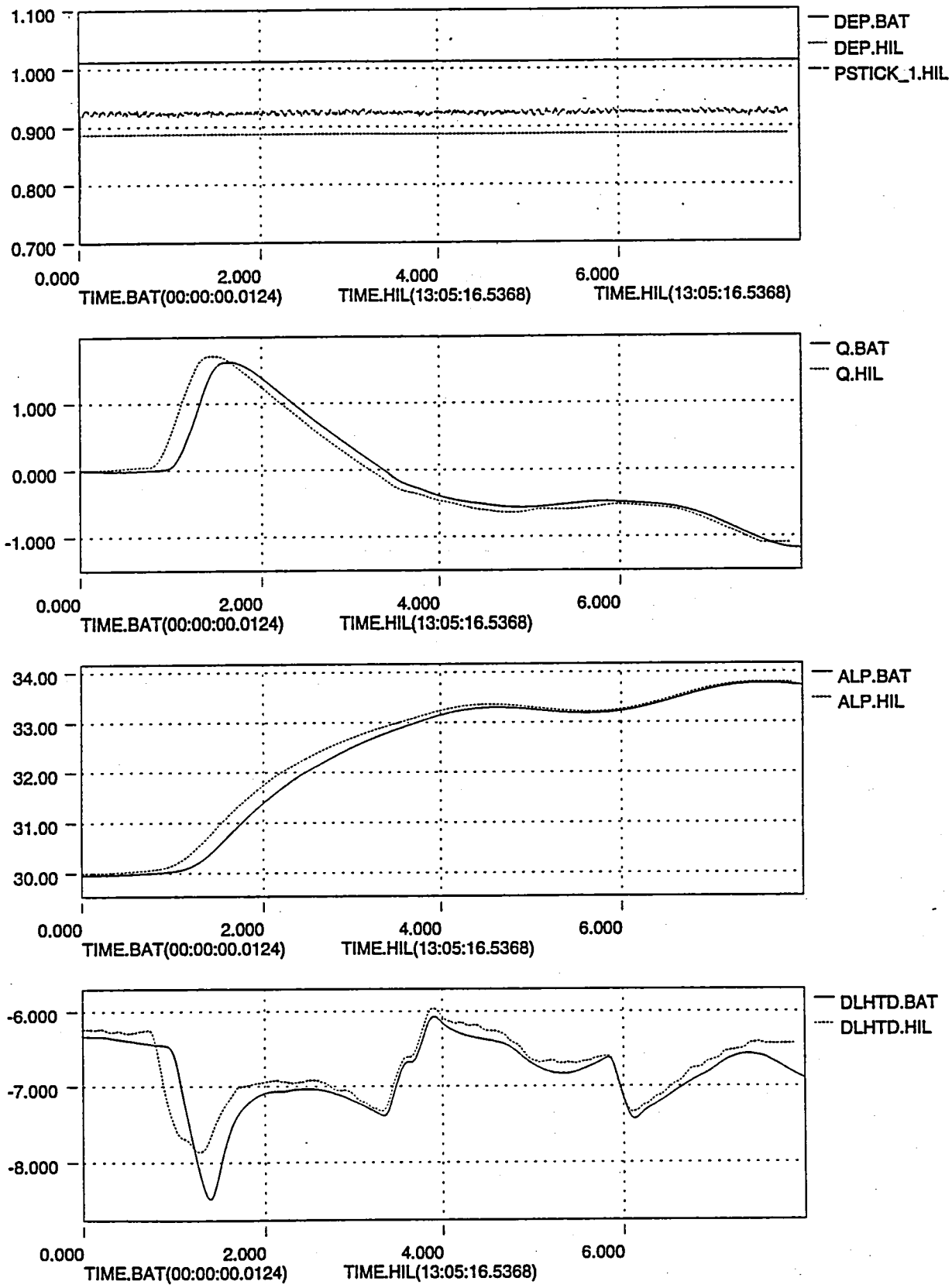

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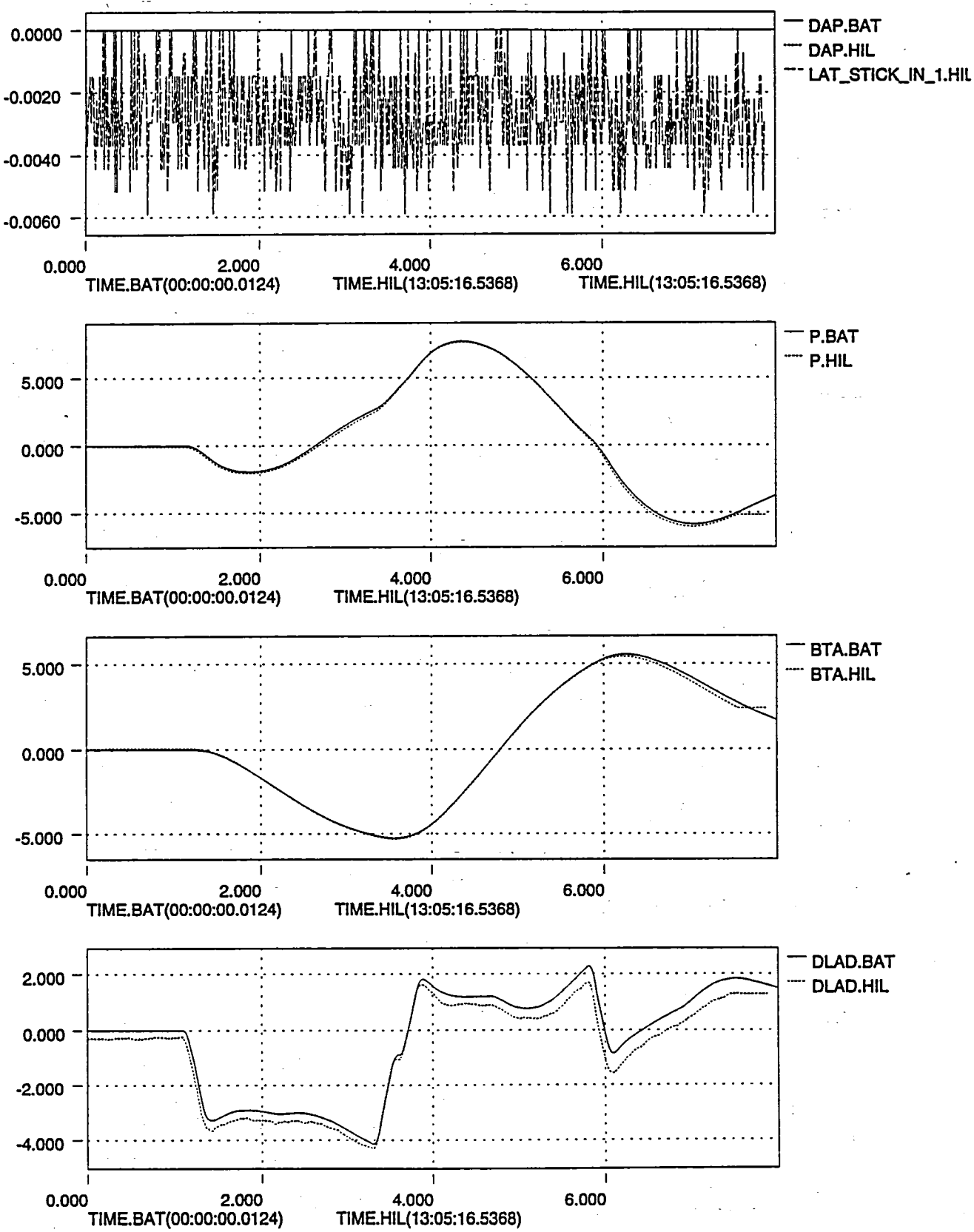

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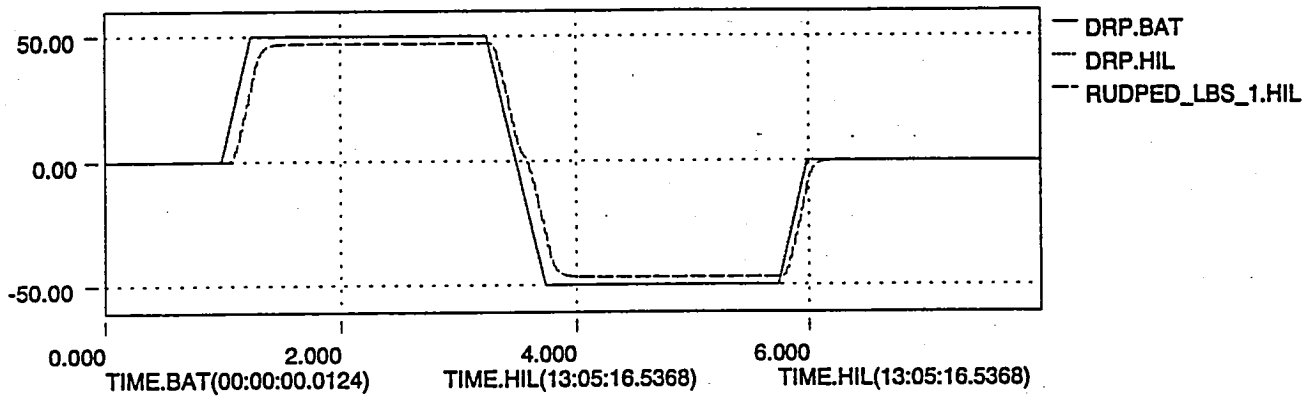

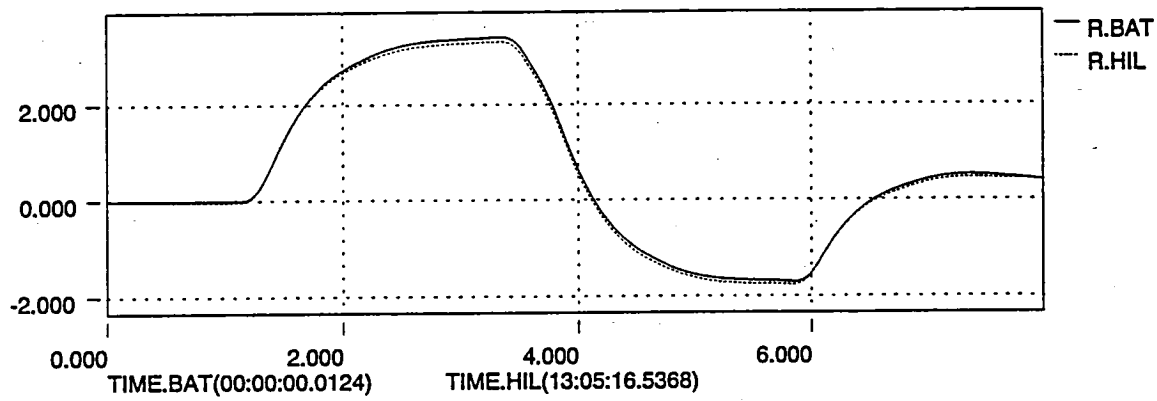

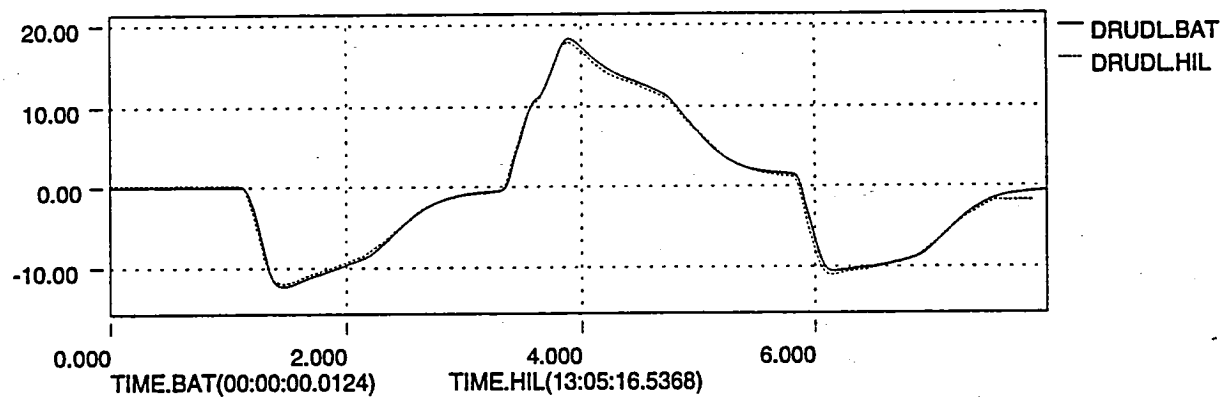

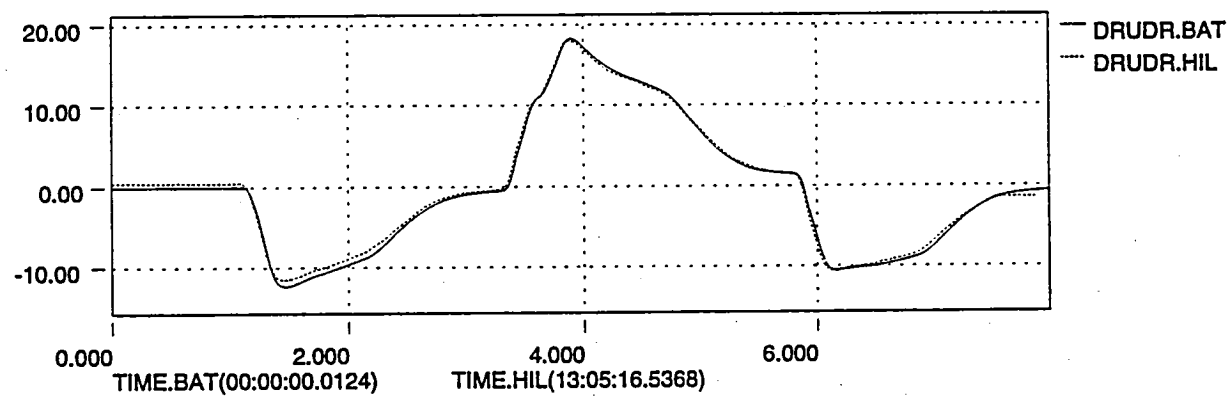

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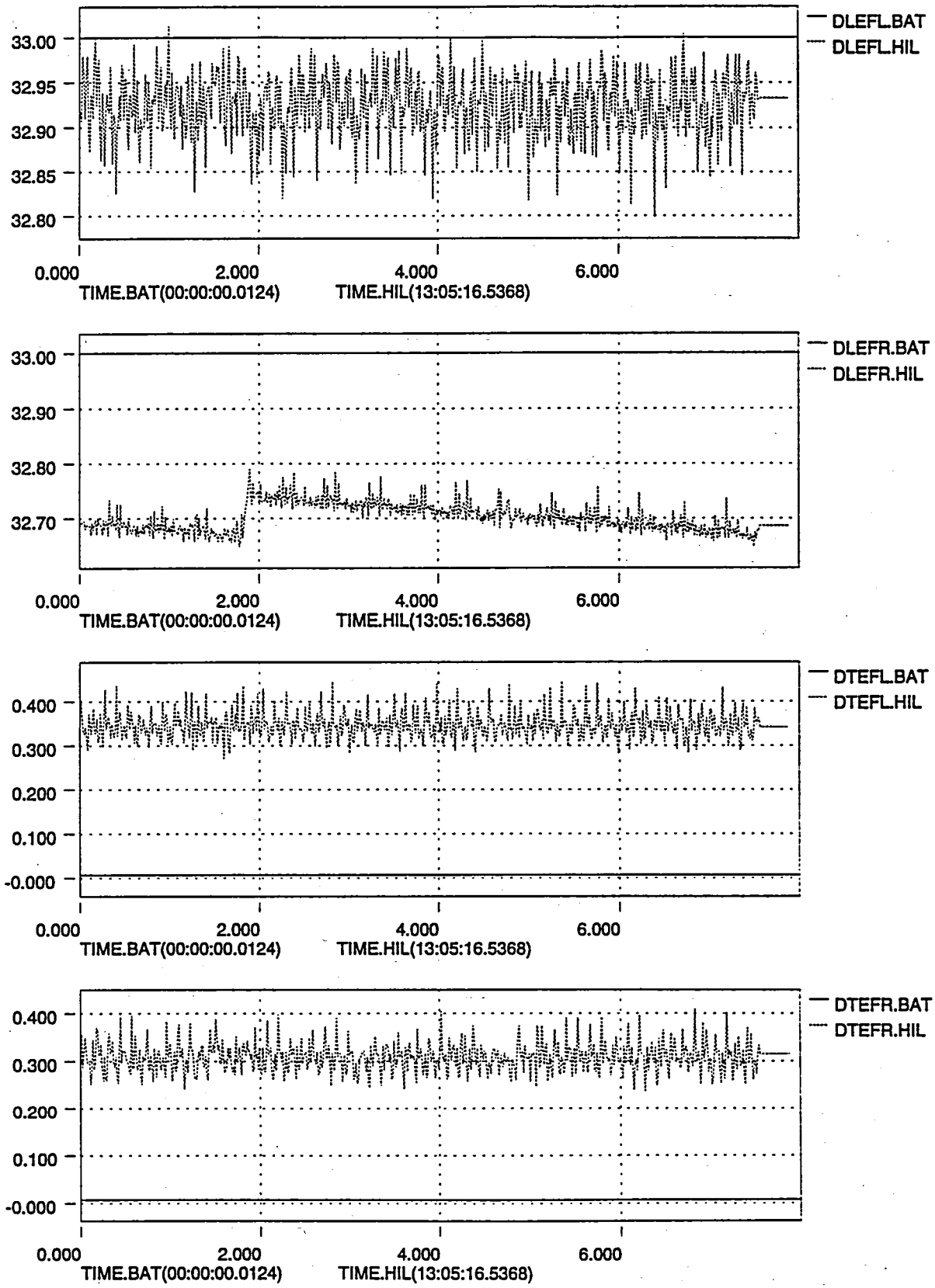
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 4/12



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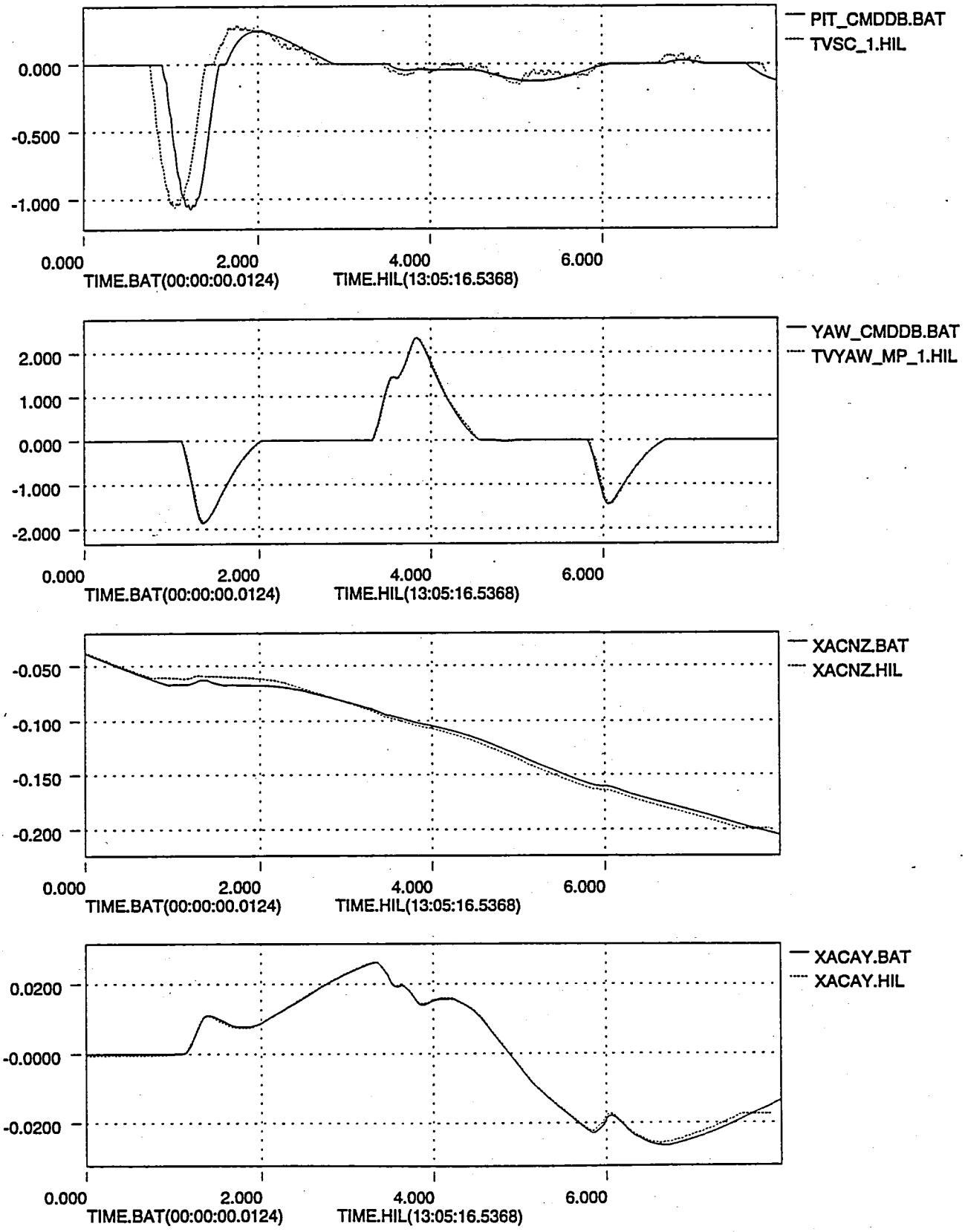
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 5/12



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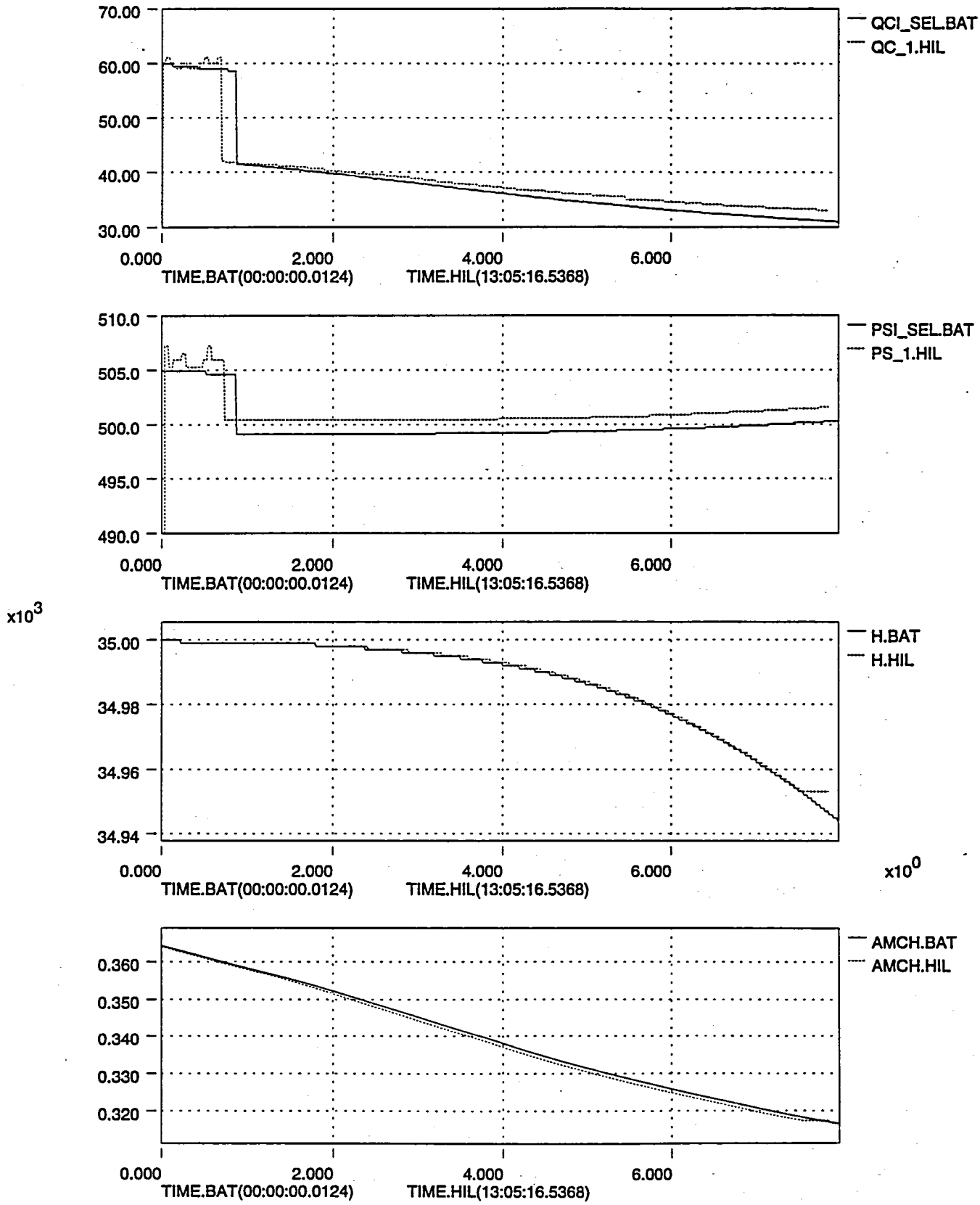
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 6/12



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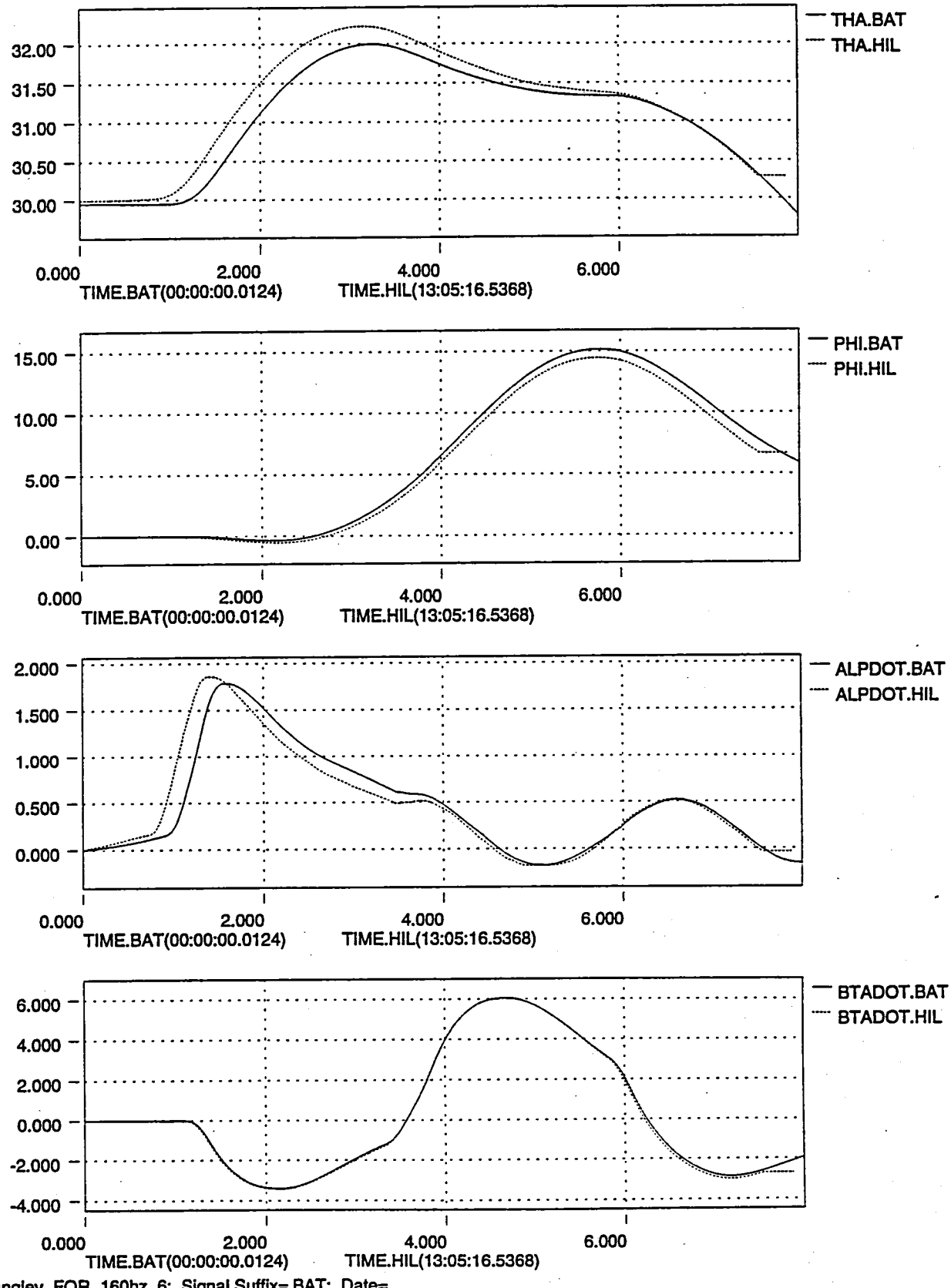
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 7/12



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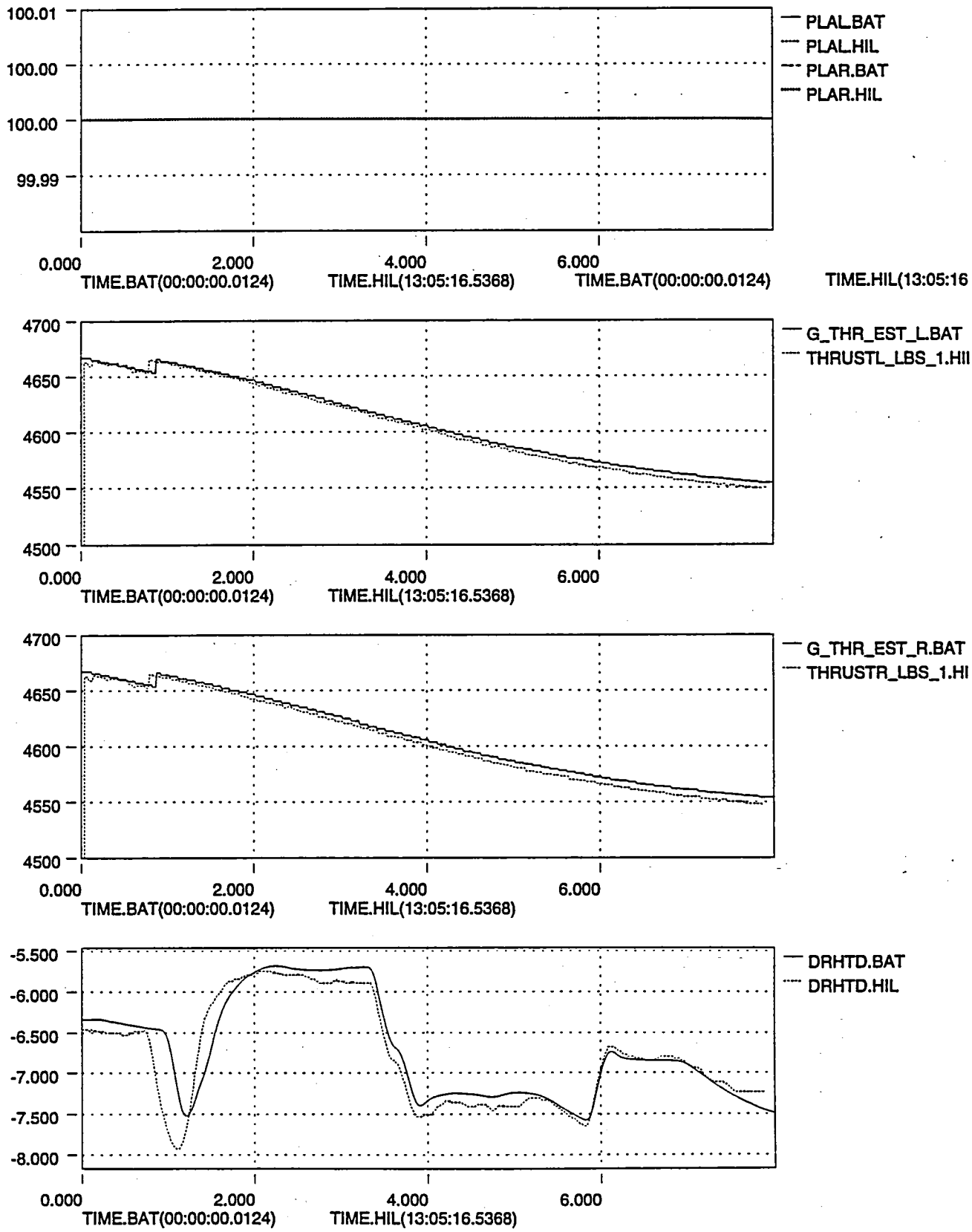
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 8/12



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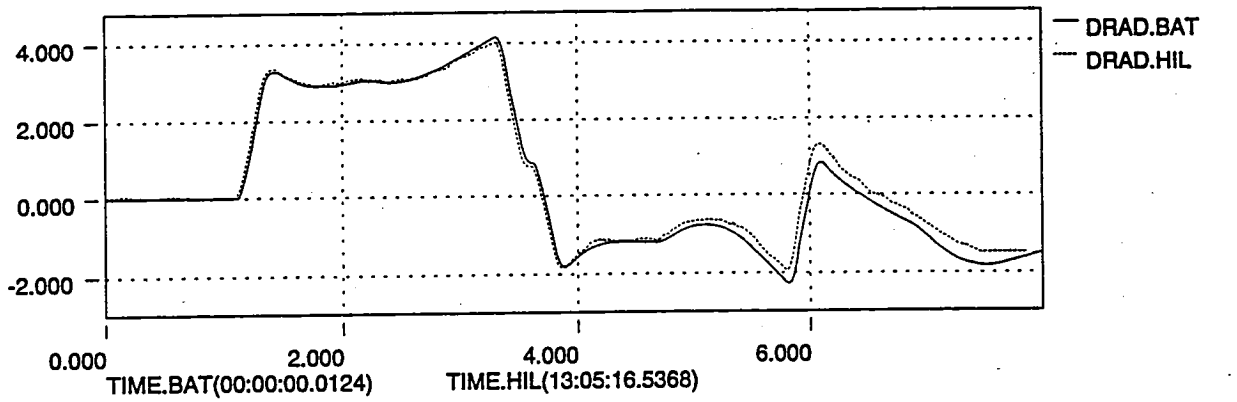

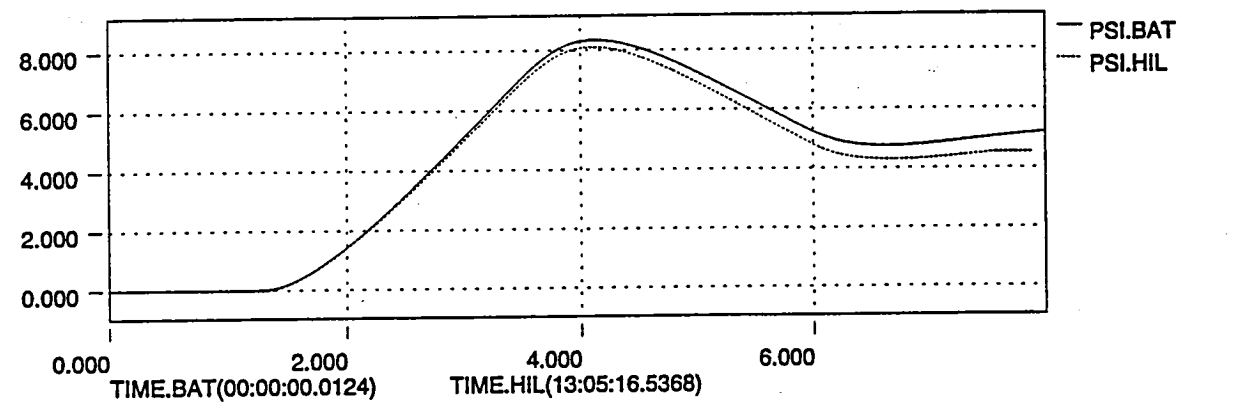

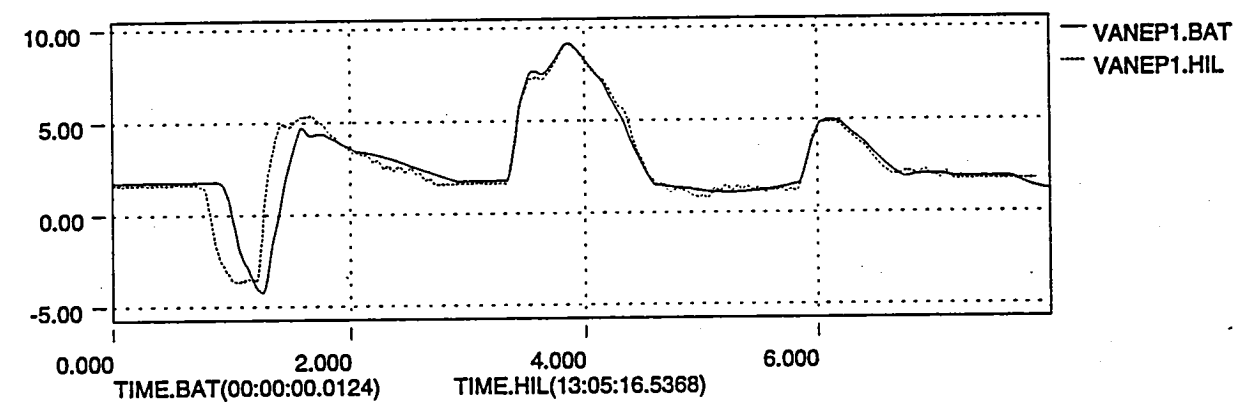

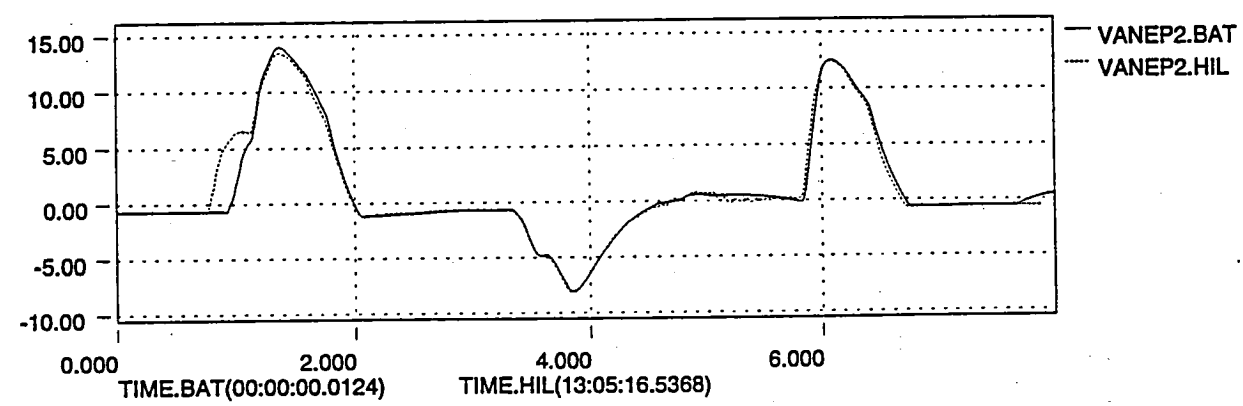

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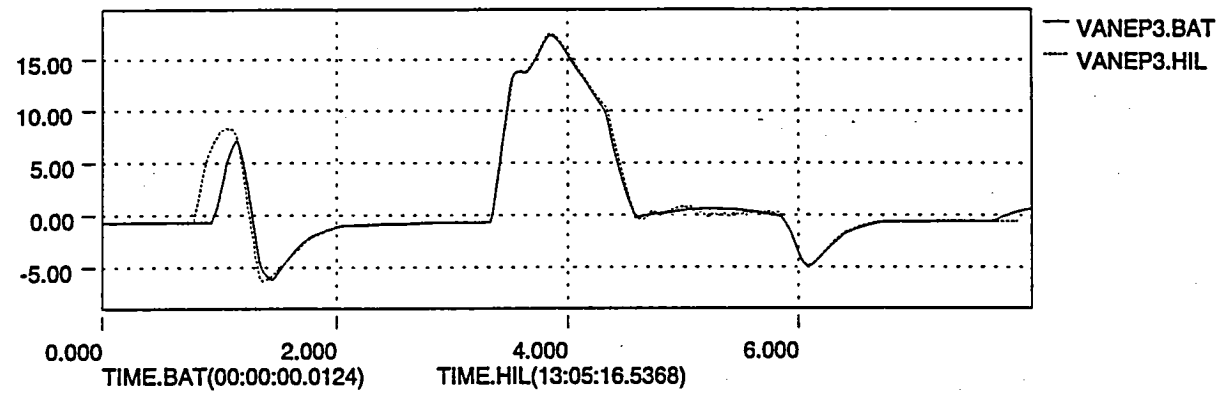
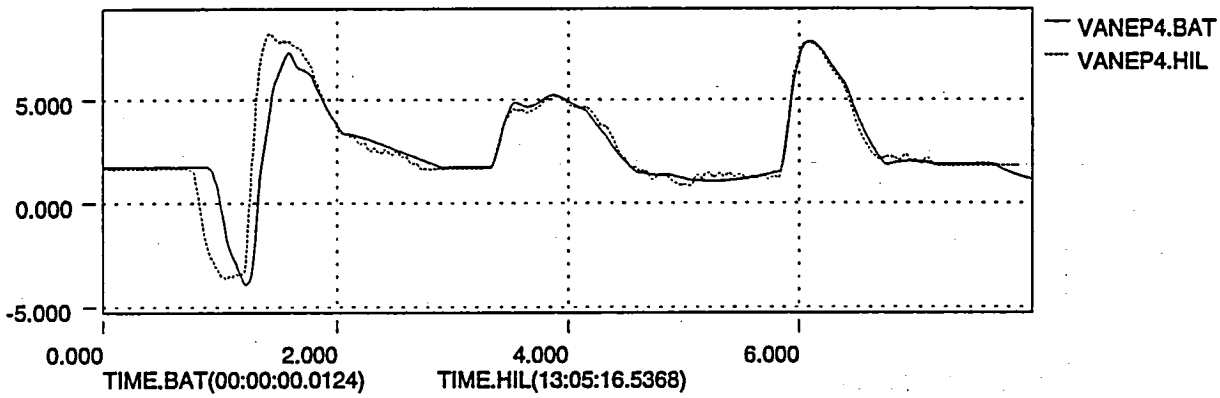
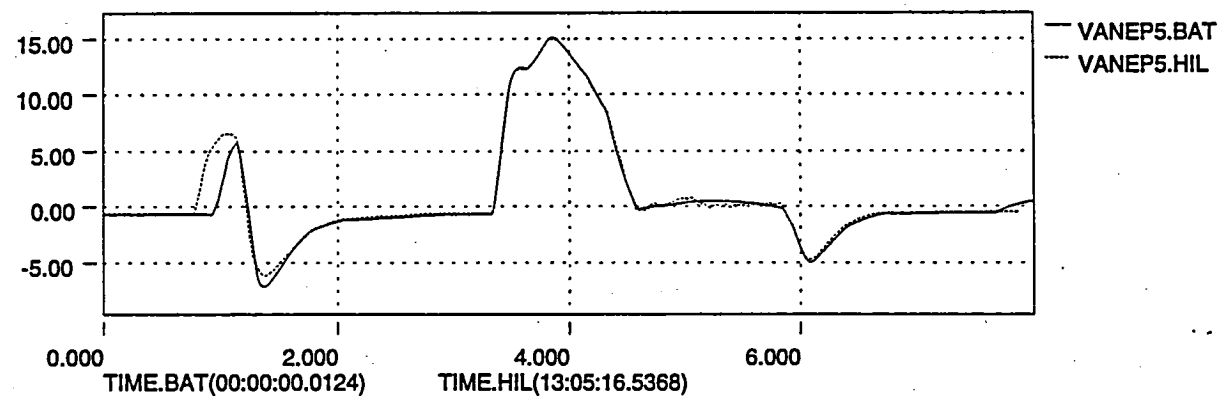
Figure 2 (Cont'd) - HIL Issue 15 - Impact Pressure Transition
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 10/12







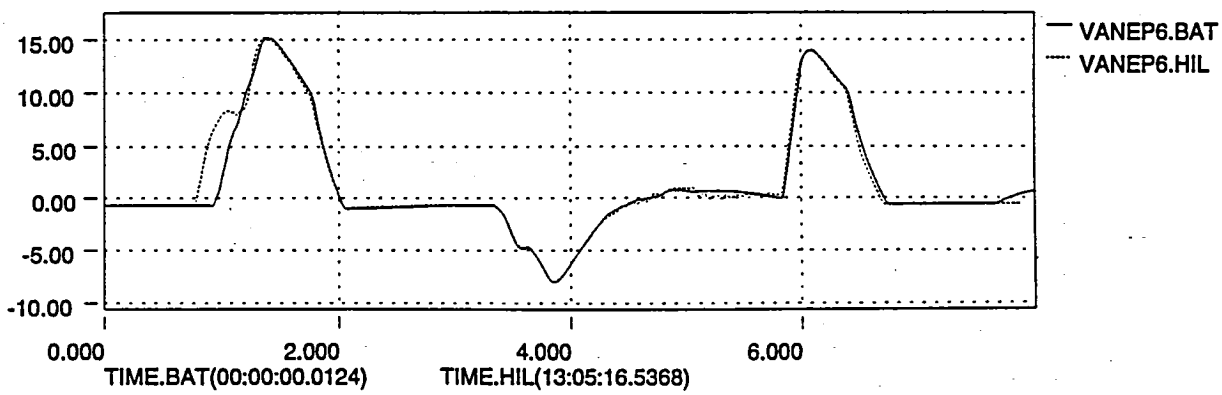


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Figure 2 (Cont'd) - HIL Issue 15 - Impact Pressure Transition
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 11/12

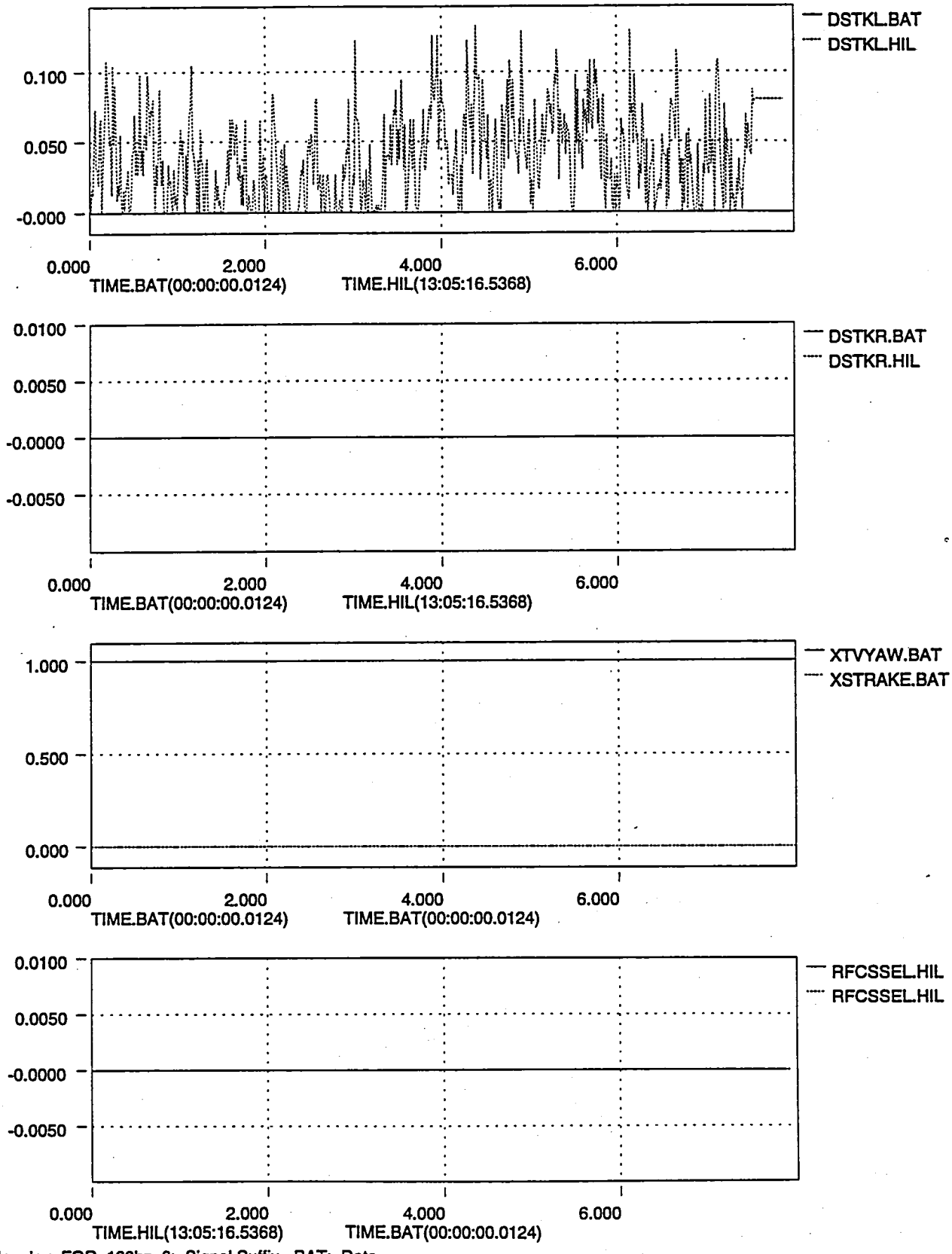

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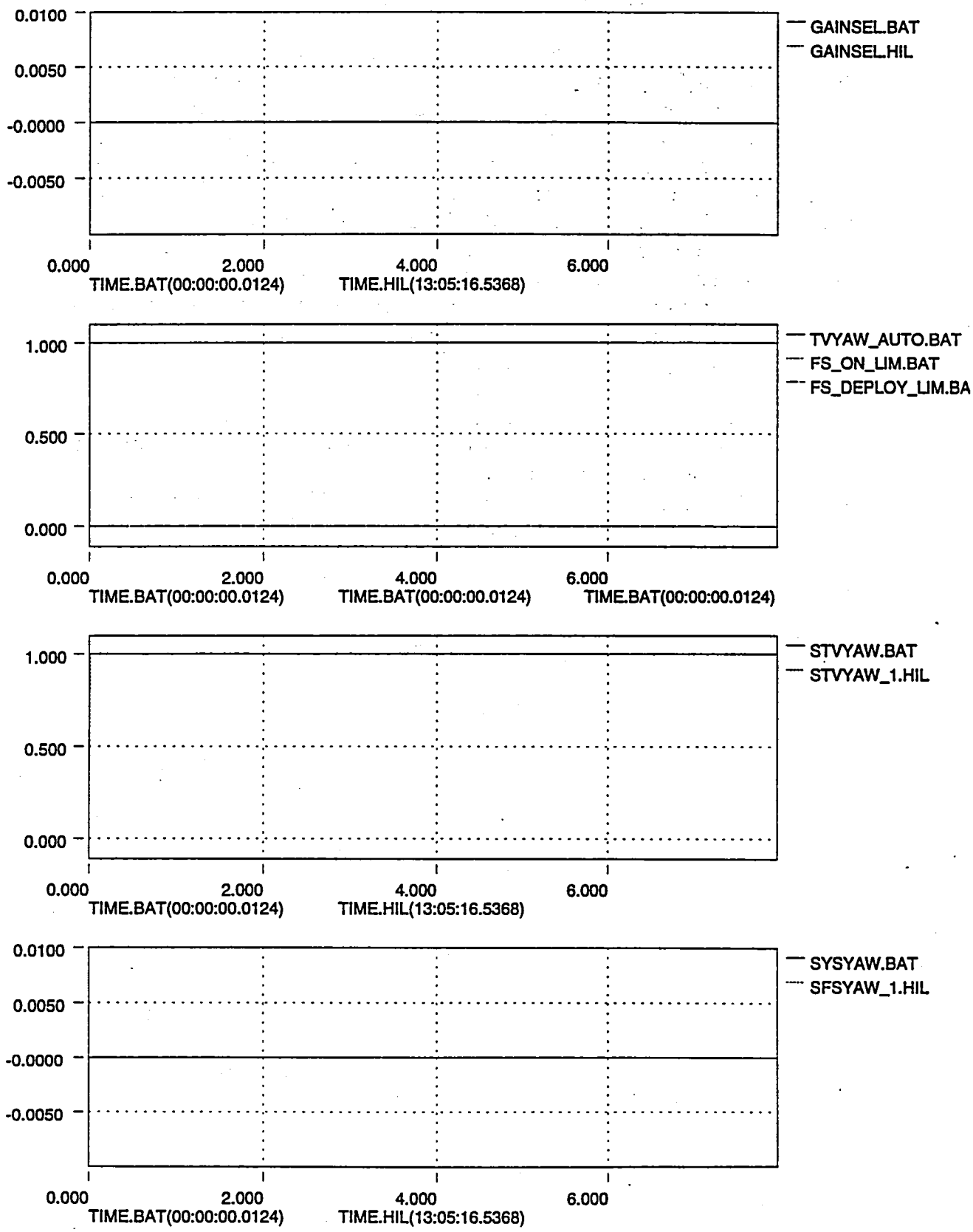
Figure 2 (Cont'd) - HIL Issue 15 - Impact Pressure Transition
CASE_6__TV_Mode__30alp-35k_Max_AB_50lb_ramp_drp page 12/12



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16 - Surface Rate Limits.

As was noticed with the NASA-1A performance validation checkcases, different no load rate limits have been observed in the HIL simulation versus the results obtained in Batch. Figure 1 shows the no load rate limit computed every 0.05 seconds for the HIL time history. Checkcase 29 was used which is an STV mode time history with inputs in all three axes. All surface deflection are shown with the letters (RL) added to the end of the usual variable name. Figure 2 contains the Batch simulation results for this same checkcase. For the Batch run, the actuator model no load rate limits are never exceeded as would be expected. In the HIL results, some significant differences can be observed in the stabilator, trailing edge flap, and left engine outboard vane (vane2).

The HIL uses analog actuator cards for all surfaces except the strakes which uses the strake actuator model previously discussed. The differences between the actuator model implementations are another discrepancy between the Batch and HIL simulations, but are not considered to be a major source of error.

Tue May 23 11:08:06 1995

Figure 1 - HIL Issue 16 - Surface Rate Limits

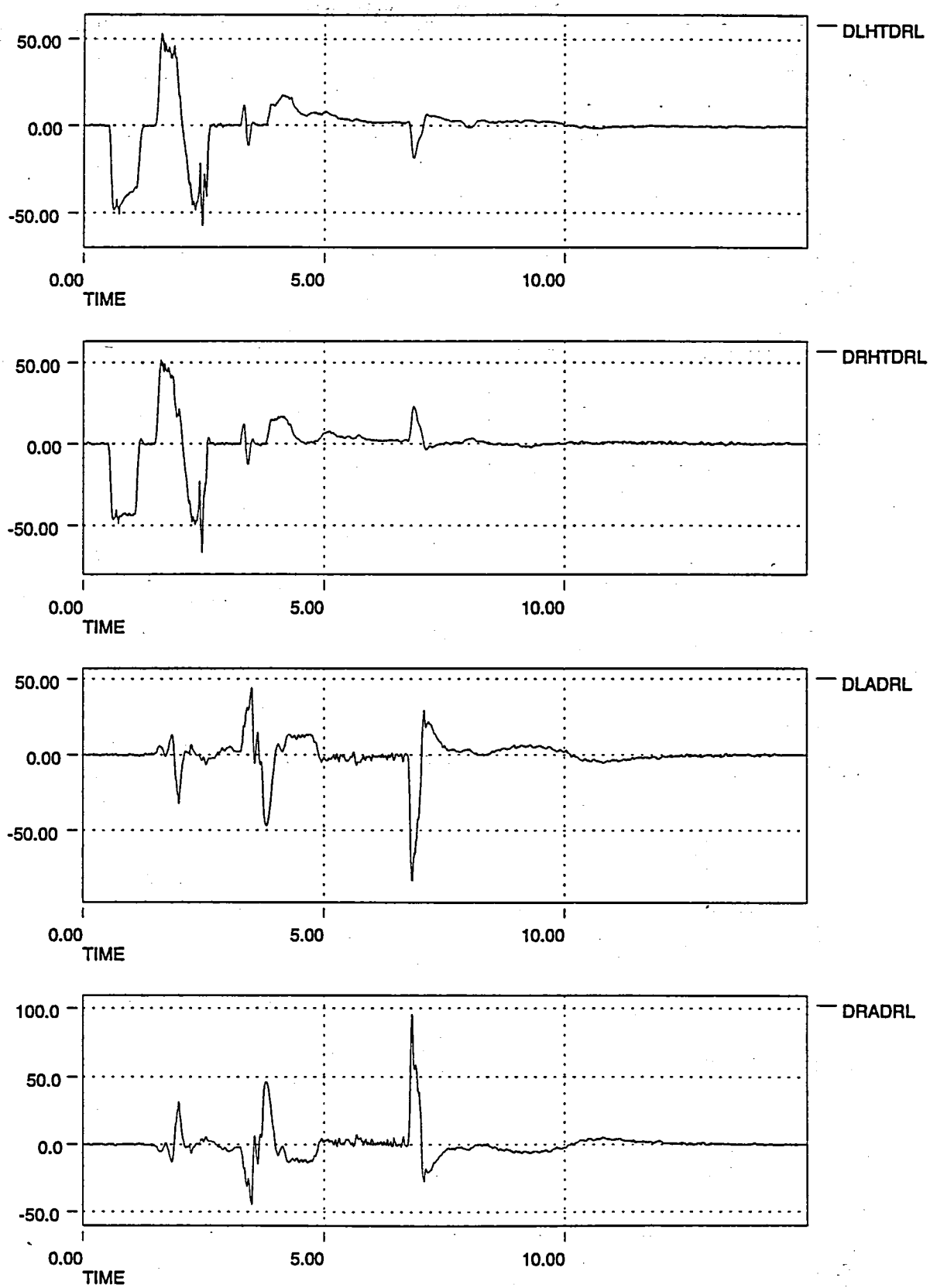

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Figure 1 (Continued) - HIL Issue 16 - Surface Rate Limits

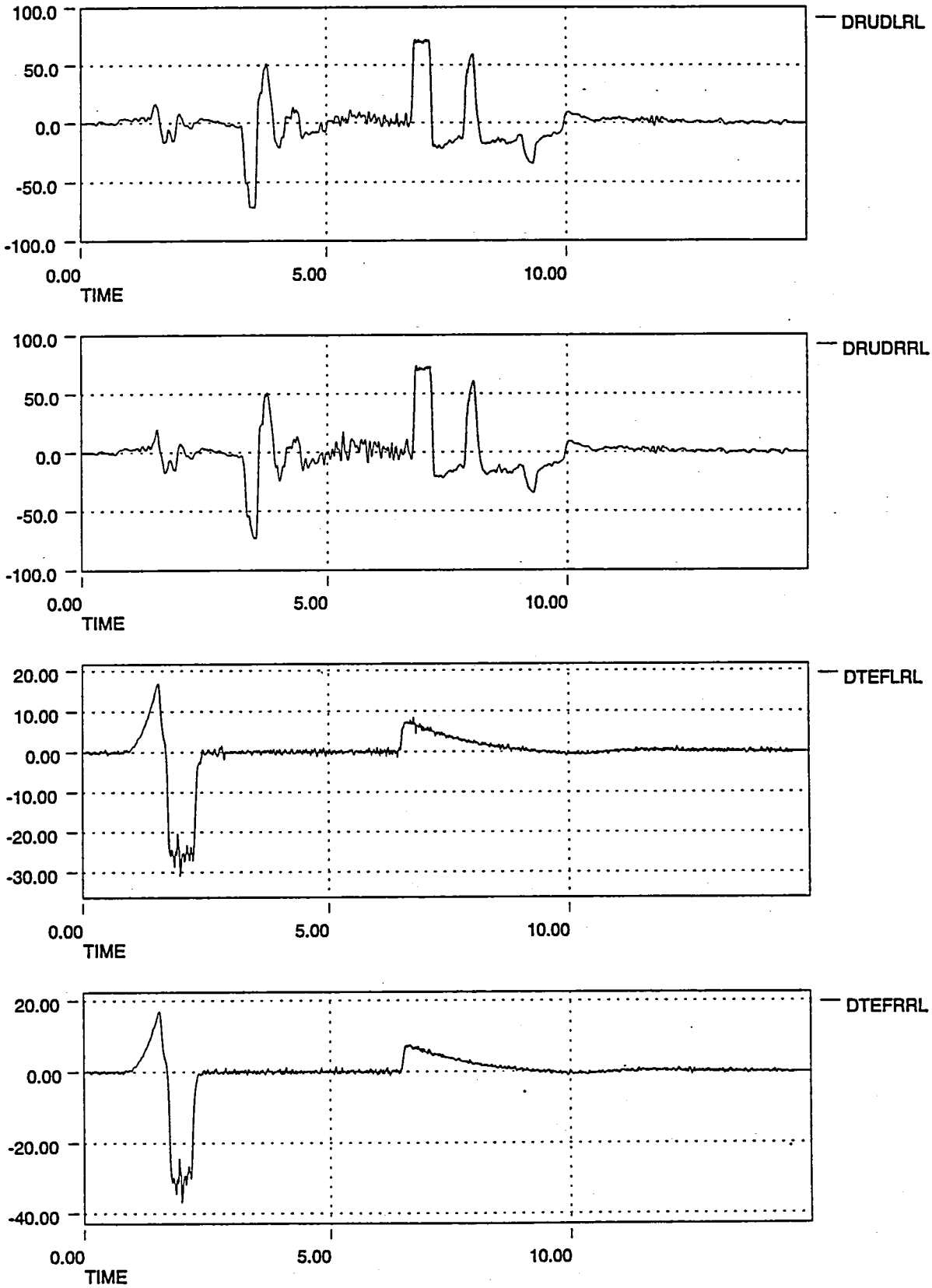

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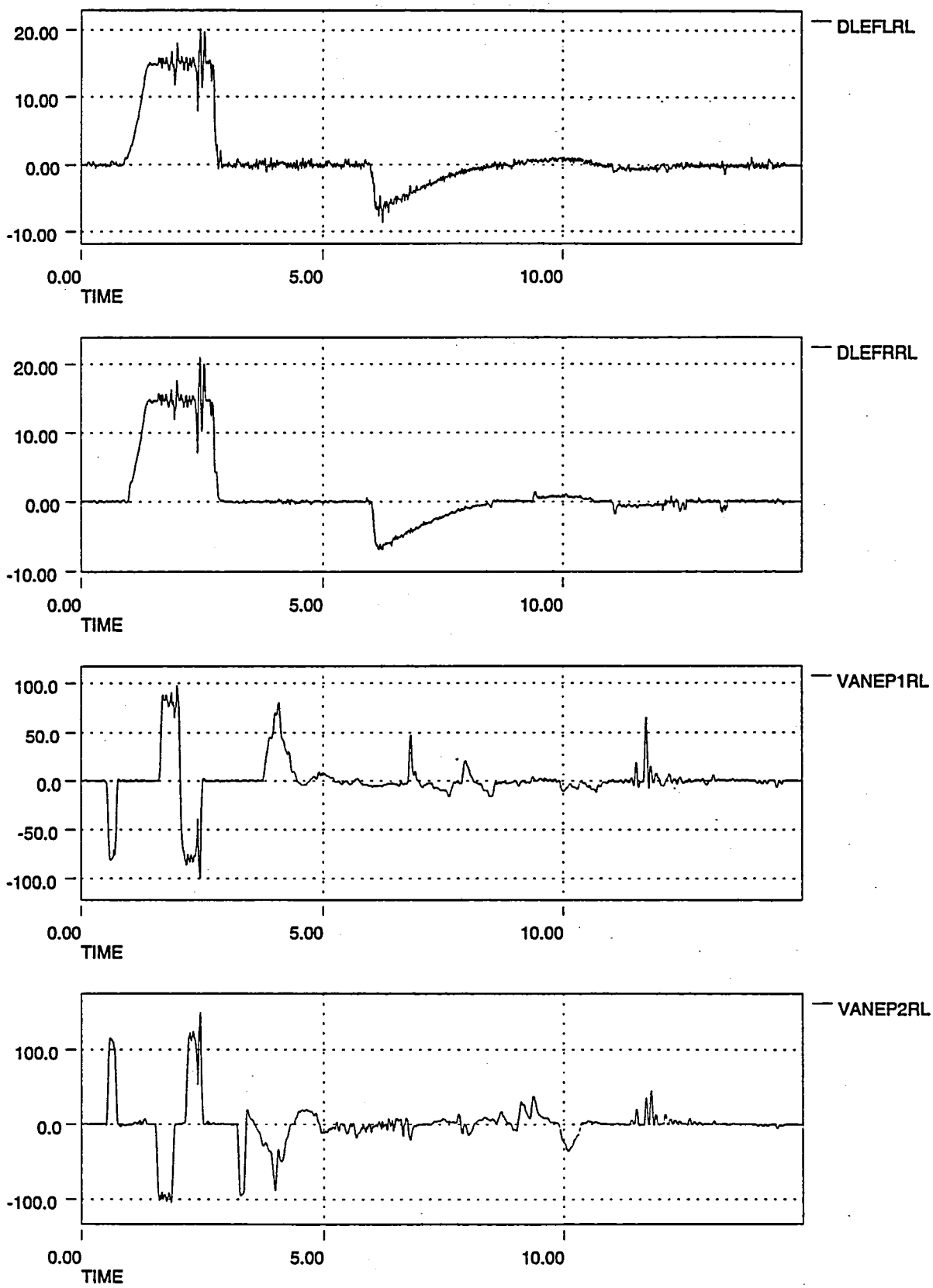
Figure 1 (Continued) - HIL Issue 16 - Surface Rate Limits



File=rlout.cmp3; Signal Suffix=[none]; Date=

Figure 1 (Continued) - HIL Issue 16 - Surface Rate Limits

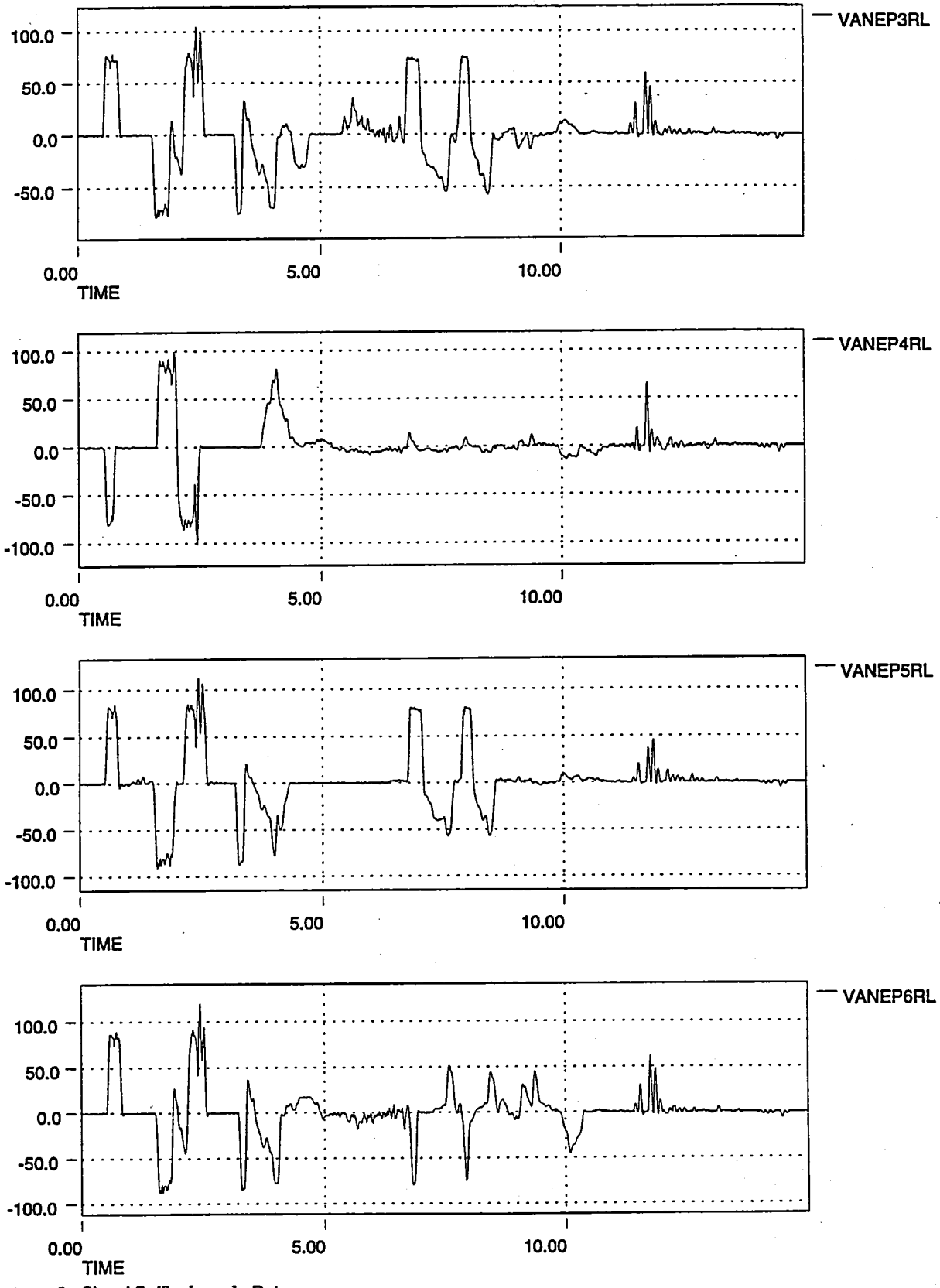


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Figure 1 (Continued) - HIL Issue 16 - Surface Rate Limits

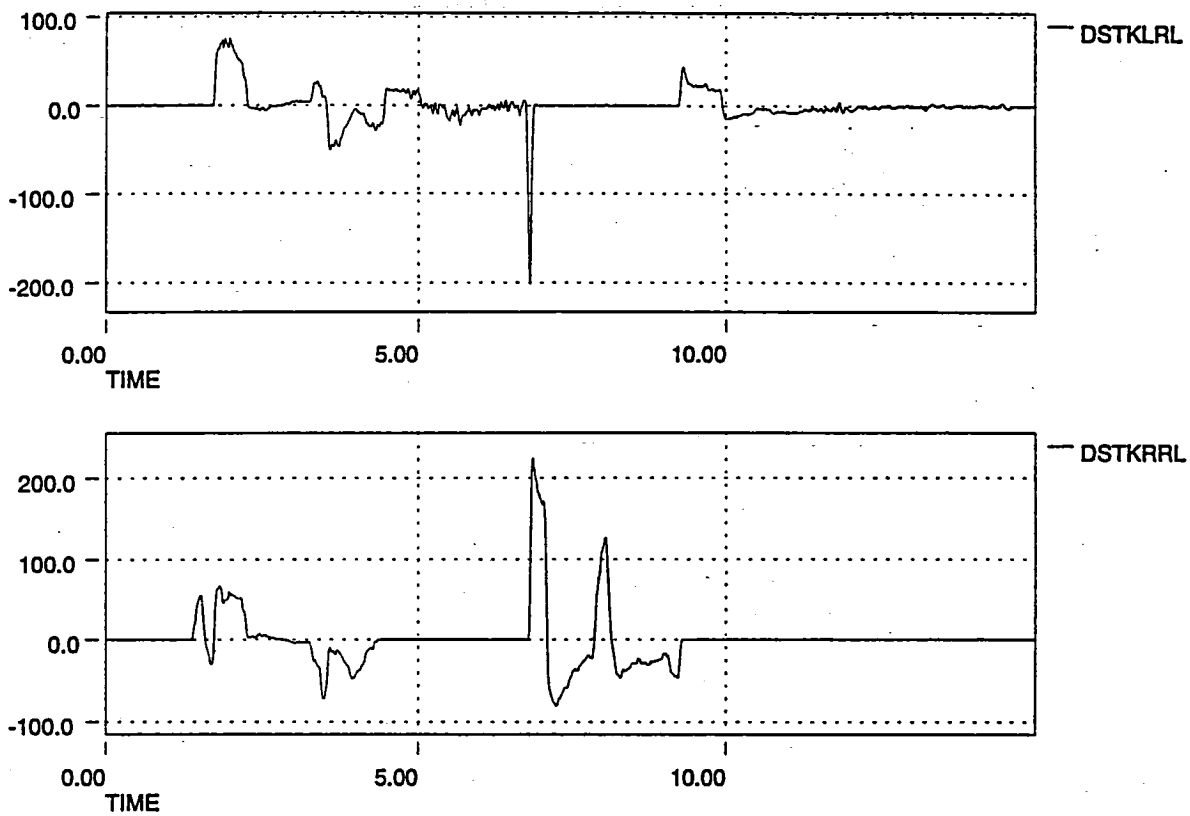

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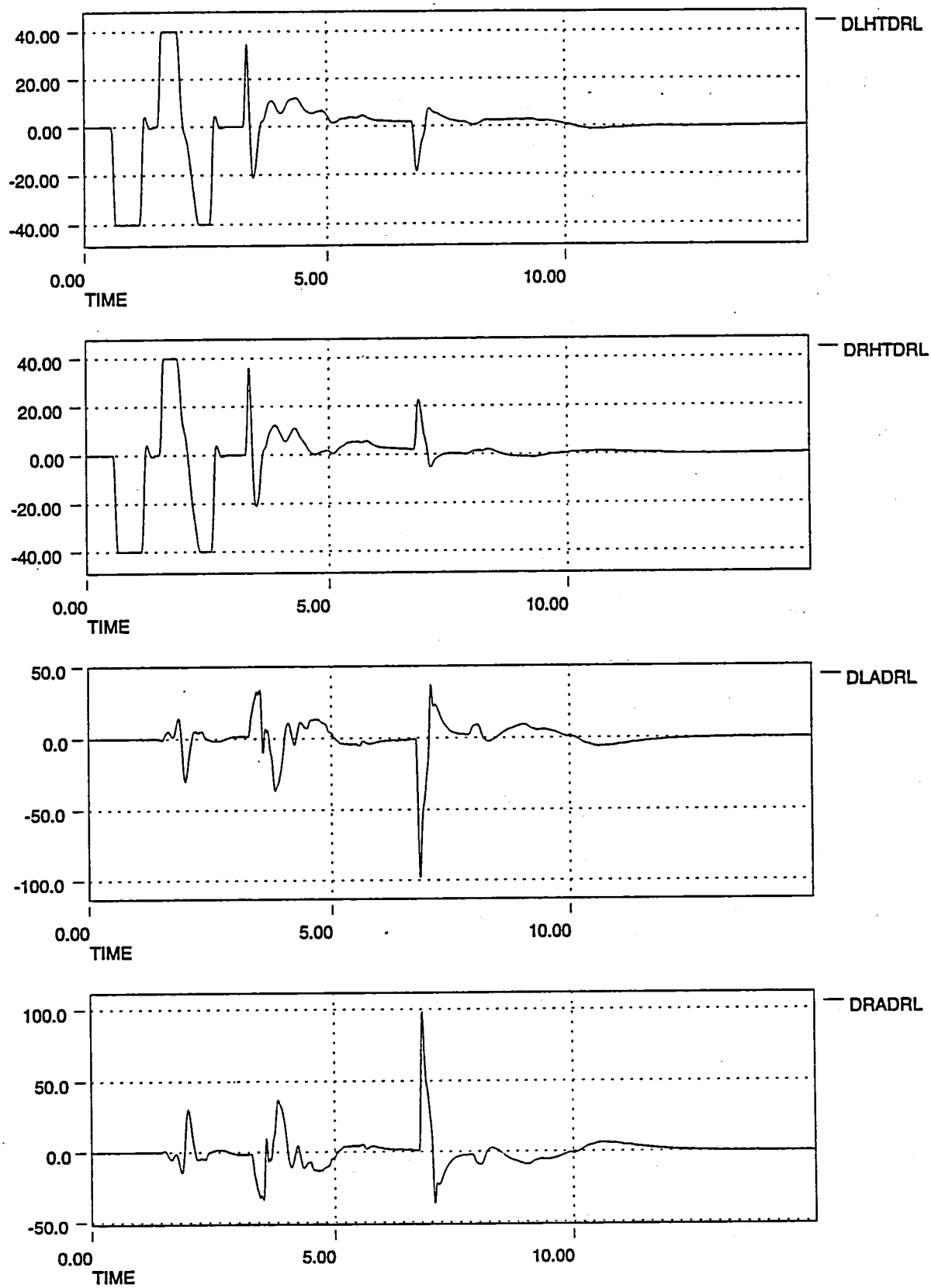
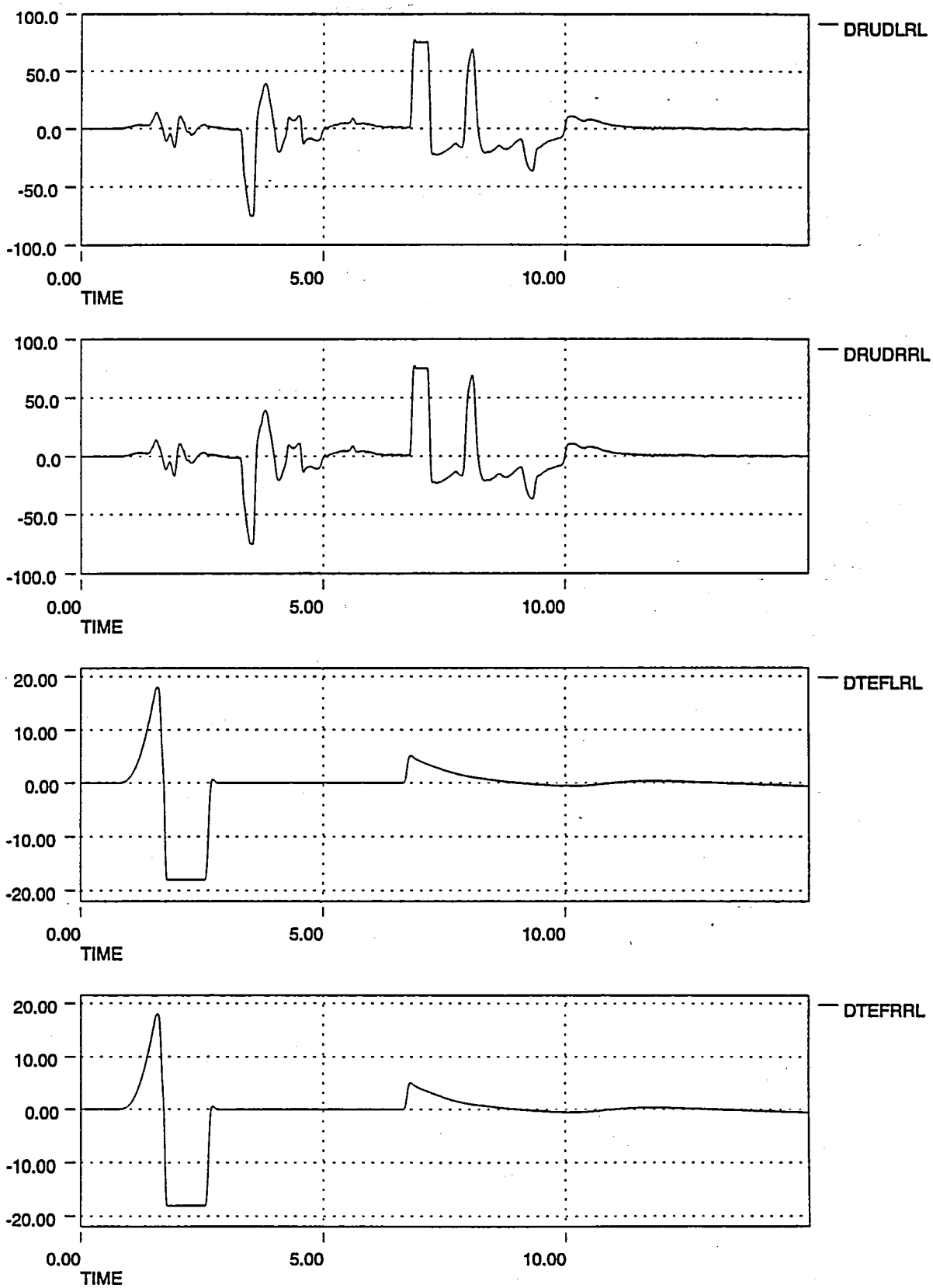
Figure 2 - HIL Issue 16 - Surface Rate Limits



File=rlout.cmp3; Signal Suffix=[none]; Date=

Figure 2 (Continued) - HIL Issue 16 - Surface Rate Limits



File=rlout.cmp3; Signal Suffix=[none]; Date=

Figure 2 (Continued) - HIL Issue 16 - Surface Rate Limits

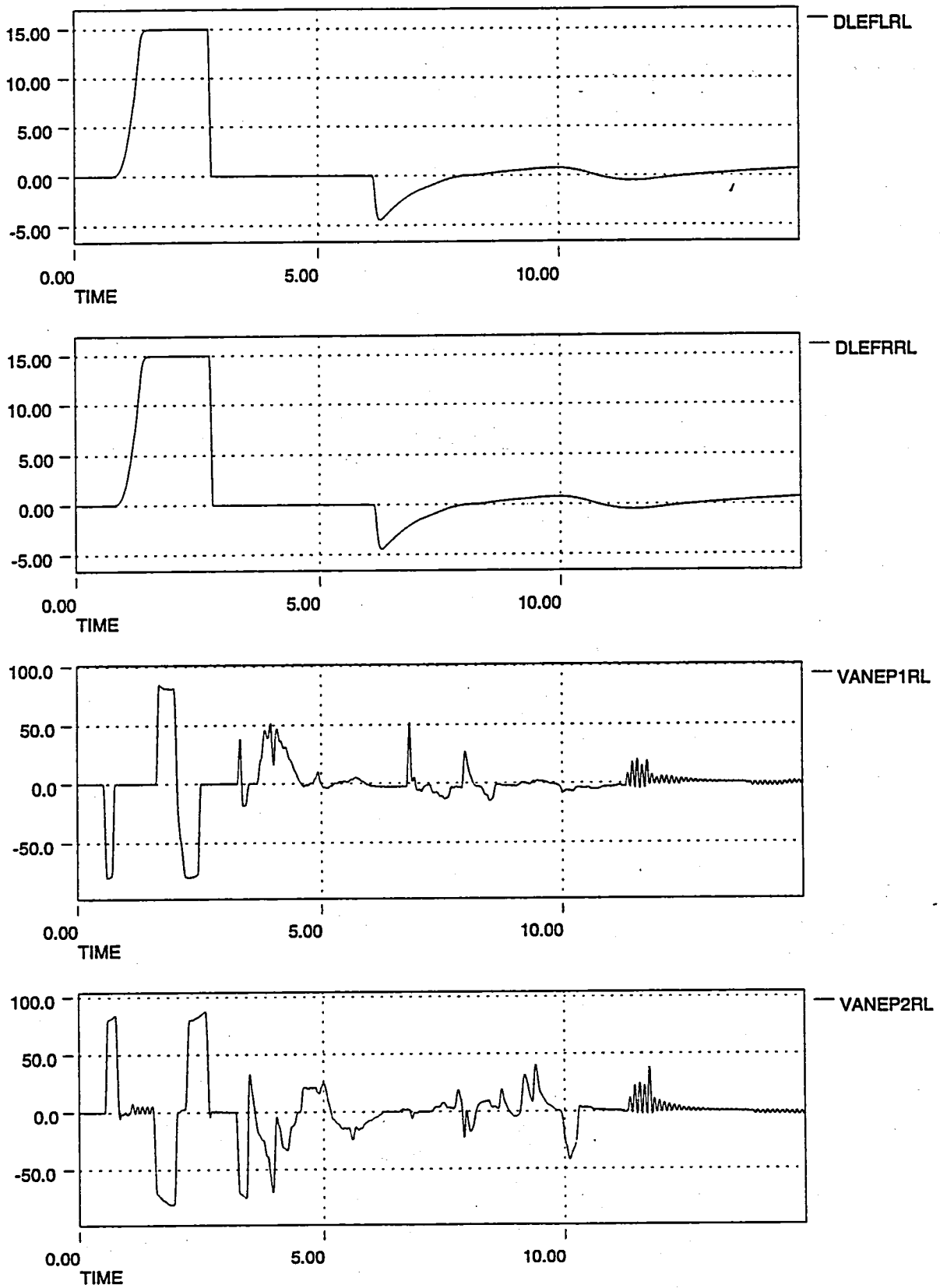


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Figure 2 (Continued) - HIL Issue 16 - Surface Rate Limits

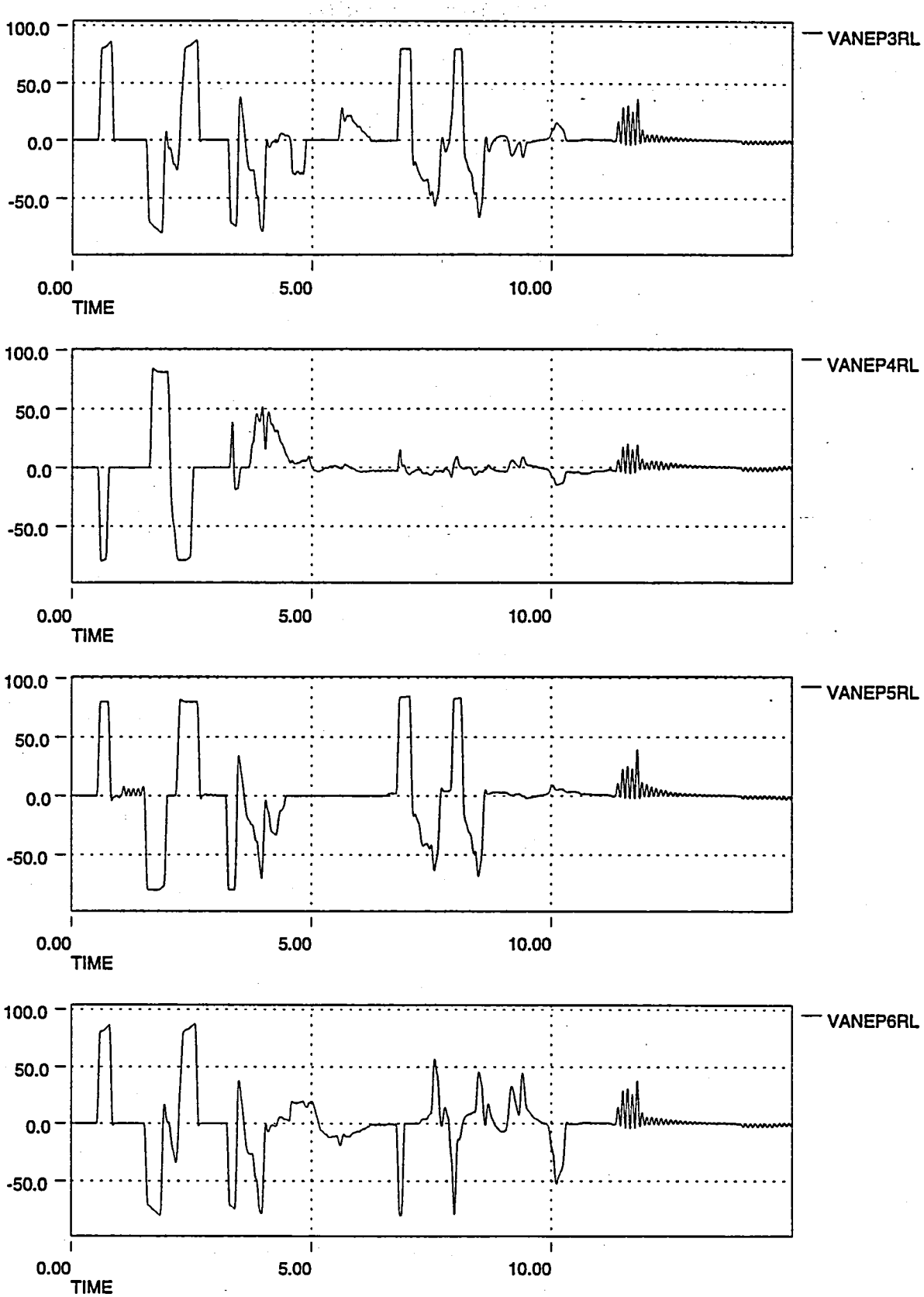

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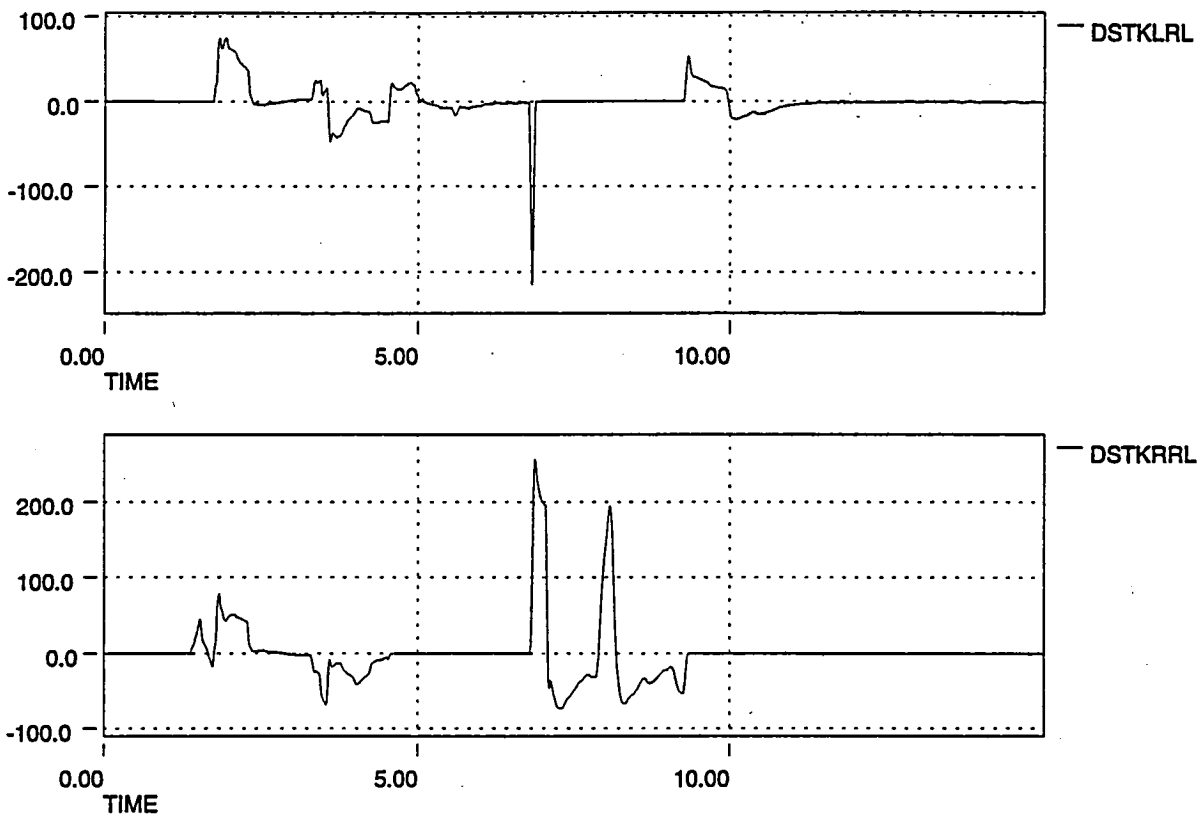
Figure 2 (Continued) - HIL Issue 16 - Surface Rate Limits



File=rlout.cmp3; Signal Suffix=[none]; Date=

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13. ABSTRACT *(Maximum 200 words)*

The ANSER Control Laws were implemented in Ada by NASA Dryden for flight test on the High Alpha Research Vehicle (HARV). The Ada implementation was tested in the Hardware-In-the-Loop (HIL) simulation, and results were compared to those obtained with the NASA Langley batch Fortran implementation of the control laws which are considered the "truth model." This report documents the performance validation test results between these implementations. This report contains the ANSER performance validation test plan, HIL vs. Batch time-history comparisons, simulation scripts used to generate checkcases, and detailed analysis of discrepancies discovered during testing.

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